ENVIRONMENTAL ANALYSIS

FOR THE

MUDD CREEK TIMBER SALE

PREPARED BY

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Plains Unit, Northwestern Land Office

Montana Department of Natural Resources and Conservation

January 30, 2007

Table of Contents

Page #

KALISPELL – PLAINS UNIT
DNRC - NORTHWEST AREA

Memo

To: Larry Ballantyne, Plains Office Forest Program Supervisor

From: Bill Wright, Kalispell-Plains Unit Manager

Date: July 18, 2001

Re: Proposed Timber Sale – Section 18, T23N, R27W

The primary objective of this proposed timber sale is to generate revenue for the Public School (C. S.) grant.

The secondary objectives for the proposed timber sale are to reduce the insect and disease activity on the tract of land and to promote historic timber types found in the area.

In planning and preparing this proposed timber sale, management direction of the State Forest Land Management Plan shall be closely followed. All applicable Streamside Management Zone (SMZ) rules and regulations and all Best Management Practices (BMP) guidelines shall be applied.

cc: Plains Cal File

CHECKLIST ENVIRONMENTAL ASSESSMENT

Project Name:	Mudd Creek Timber Sale
Proposed Implementation Date:	June 2007
Proponent:	Department of Natural Resources and Conservation, Northwest Land Office, Plains Unit
Location:	Section 18, Township 22N, Range 26W
County:	Sanders

I. TYPE AND PURPOSE OF ACTION

The Department of Natural Resources and Conservation (DNRC) proposes to sell 29,000 tons (4.0MMBF**)** of timber in the Little Thompson River Drainage, Section 18, Township 22N, Range 26W, 13 air miles northwest of Plains, Montana. This action would produce estimated revenue of $1,300,000.00 for the Public Buildings (P. B.) Trust Grant. Activities proposed would maintain and improve forest health, reduce fuel loading, and increase forest productivity beneficial to future trust actions. (See Attachment 1, Area Maps, and Project Plan).

Six units totaling approximately 600 acres are proposed. The project would require the construction of approximately 6.0 miles of new road and the reconditioning and upgrading of approximately 2.5 miles of existing roads.

Lands involved in this proposed project are held by the State of Montana in trust for the support of specific beneficiary institutions such as the public buildings trust, public schools, state colleges, universities, and other state institutions (Enabling Act of February 22, 1889:1972 Montana Constitution, Article 1 Section11). The Board of Land Commissioners and the Department of Natural Resources and Conservation are required, by law, to administer these trust lands to produce the largest measure of reasonable and legitimate return over the long run for these beneficiary institutions (Section 77-1-202, MCA). In March 2003, the Montana Department of Natural Resources and Conservation adopted Administrative rules for Forest Management (ARM 36.11.401 through 450). The DNRC would manage lands involved in this project in accordance with the Rules.

II. PROJECT DEVELOPMENT

1. PUBLIC INVOLVEMENT, AGENCIES, GROUPS OR INDIVIDUALS CONTACTED:

Provide a brief chronology of the scoping and ongoing involvement for this project.

Public involvement has been solicited through newspaper advertisements plus letters sent to adjacent landowners and other known interested parties and organizations. Public response was received and used to assist in defining issues surrounding the proposed project. Hydrological, soils, wildlife and vegetative concerns were identified by DNRC specialists and field foresters for the Action Alternative as well as the effects of the No Action Alternative. Issues and concerns have been resolved or mitigated through project design or would be included as specific contractual requirements of the project. Recommendations to minimize direct, indirect and cumulative impacts have been incorporated in the project design (see Attachment 1, Area Maps and Project Plan; Attachment 2, Resource Analysis; Attachment 3, Prescriptions; Attachment 4, Mitigation; Attachment 5, Consultants and References).

2. OTHER GOVERNMENTAL AGENCIES WITH JURISDICTION, LIST OF PERMITS NEEDED:

The DNRC has an existing Reciprocal Access Agreement with Plum Creek Marketing Inc. Temporary road use permits would be obtained for the road segments not covered by these agreements prior to beginning project.

3. ALTERNATIVES CONSIDERED:

Action: The Action Alternative is shown in Section 1, Type and Purpose of Action. No other action alternatives were identified during project scoping or analysis; therefore only forest product removal and sale are analyzed in the EA Checklist. Recommended actions to reduce environmental effects would be incorporated into the proposed action.
No Action: Under the No Action Alternative, no activity would be undertaken. No timber would be harvested and no road construction or improvements would occur. The No Action alternative would result in decreased growth rates, continued decline of stand conditions and increased fuel loading within the timber stands. This alternative would not produce revenue for the Public Buildings Trust grant. Effects of the No Action Alternative are show in the Checklist and Attachments and can be used to compare effects of the proposed action.

III. IMPACTS ON THE PHYSICAL ENVIRONMENT

- *RESOURCES potentially impacted are listed on the form, followed by common issues that would be considered.*
- *Explain POTENTIAL IMPACTS AND MITIGATIONS following each resource heading.*
- *Enter "NONE" If no impacts are identified or the resource is not present.*

4. GEOLOGY AND SOIL QUALITY, STABILITY AND MOISTURE:

Consider the presence of fragile, compactable or unstable soils. Identify unusual geologic features. Specify any special reclamation considerations. Identify any cumulative impacts to soils.

Recommendations from a DNRC specialist to minimize direct, indirect, and cumulative impacts have been incorporated in the project design. (Attachment 1, Area Maps and Project Plan: Attachment 2, Resource Analysis: Attachment 3, Prescriptions: Attachment 4, Mitigation). As detailed in the Soils Analysis, limiting the area of adverse effects would control cumulative effects.

5. WATER QUALITY, QUANTITY AND DISTRIBUTION:

Identify important surface or groundwater resources. Consider the potential for violation of ambient water quality standards, drinking water maximum contaminant levels, or degradation of water quality. Identify cumulative effects to water resources.

A DNRC hydrologist has reviewed the project area, transportation system and harvest plan. Recommendations to minimize impacts have been incorporated into the project design (See Attachment 2, Resource Analysis, Hydrology Analysis/Soils Analysis; Attachment 4 Mitigation Measures). Cumulative effects to sediment delivery and water yield would be limited through BMP implementation.

6. AIR QUALITY:

What pollutants or particulate would be produced? Identify air quality regulations or zones (e.g. Class I air shed) the project would influence. Identify cumulative effects to air quality.

The project is located in Montana State Airshed 2; it is not within a Class 1 Airshed. Some particulate matter would be introduced into the Airshed from the burning of logging slash. Impacts are expected to be minor and temporary with slash burning to be conducted when conditions favor good to excellent smoke dispersion. All burning would be conducted during times of adequate ventilation within the existing rules and regulations.

7. VEGETATION COVER, QUANTITY AND QUALITY:

What changes would the action cause to vegetative communities? Consider rare plants or cover types that would be affected. Identify cumulative effects to vegetation.

Silvicultural prescriptions have been developed to keep stands moving towards historic desired cover types through the removal of diseased, insect infested and non-preferred timber species.

Recommendations to minimize direct, indirect and cumulative impacts have been incorporated in the project design (see Attachment 1, Area Maps and Project plan: Attachment 2, Resource Analysis, Attachment 3, Prescriptions; Attachment 4, Mitigation). Tree removal would change some age classes, size classes, and remove approximately 30 acres from timber production to create road access into the section. No old growth stands as defined by Green (1992) are present in the project area; therefore the action alternative would not affect old growth. No sensitive plants listed by the Montana Natural Heritage Program have been identified in the project area. Measures to minimize noxious weeds, insects and disease are included in the project design. (see Attachment 4, Mitigation).

8. TERRESTRIAL, AVIAN AND AQUATIC LIFE AND HABITATS:
Consider substantial habitat values and use of the area by wildlife, birds or fish. Identify cumulative effects to fish and wildlife.

The Mudd Creek sale area is in big game habitat. (See Attachment 2, Resource Analysis, Wildlife Analysis). The proposed activities are designed to limit impacts to wildlife habitat. Unit marking and treatments would maintain visual screening along open road systems. Wildlife security would be maintained through active road management. To minimize the affect to fish habitat by increased sediment delivery to streams and decreased levels of recruitable woody debris, no timber harvest or road construction activities would take place in the SMZ's (See Attachment 2, Resource Analysis; Fisheries Analysis).
Best Management Practices (BMPs) would be implemented during harvest and road construction operations; therefore the risk of adverse cumulative impacts to water quality and beneficial uses would be minimal.

9. UNIQUE, ENDANGERED, FRAGILE OR LIMITED ENVIRONMENTAL RESOURCES:
Consider any federally listed threatened or endangered species or habitat identified in the project area. Determine effects to wetlands. Consider Sensitive Species or Species of special concern. Identify cumulative effects to these species and their habitat.

Three species indigenous to northwestern Montana are classified as "sensitive" or endangered" under the Endangered Species Act of 1973. The gray wolf is listed as "endangered" while the flammulated owl and pileated woodpecker are listed as "sensitive". The analysis identified suitable habitat for the following threatened, endangered, and sensitive species in the project area and vicinity: the gray wolf, the flammulated owl and pileated woodpecker. Recommendations to minimize direct, indirect and cumulative impacts have been incorporated into project design. (See Attachment 2, Resource Analysis; Wildlife Analysis).

10. HISTORICAL AND ARCHAEOLOGICAL SITES:
Identify and determine effects to historical, archaeological or paleontological resources.

A DNRC archeologist has reviewed this project. Significant sites or artifacts were not identified during these reviews. (See Attachment 2, Resource Analysis, Archeologist findings (e-mail communication)).

11. AESTHETICS:
Determine if the project is located on a prominent topographic feature, or may be visible from populated or scenic areas. What level of noise, light or visual change would be produced? Identify cumulative effects to aesthetics.

Portions of the project would be visible from the County Road # 7512 and Todd Creek Road # 887. Openings from skyline corridors, skid trails and changes in tree cover density would be seen from these locations until regeneration has reached the point of canopy closure again. The selective harvest prescriptions, the use of skyline yarding systems, and the inclusion of a buffer strip along the main roads should minimize the visual impacts. The end result should be aesthetically acceptable for most people, as the resulting stands will still be denser and contain larger trees than does most or the surrounding ownership. Prescriptions are designed to mimic historical stand conditions and should not have an adverse visual impact on the area. (See Attachment 4, Mitigation).

12. DEMANDS ON ENVIRONMENTAL RESOURCES OF LAND, WATER, AIR OR ENERGY:
Determine the amount of limited resources the project would require. Identify other activities nearby that the project would affect. Identify cumulative effects to environmental resources.

No impacts are likely to occur under either alternative.

13. OTHER ENVIRONMENTAL DOCUMENTS PERTINENT TO THE AREA:
List other studies, plans or projects on this tract. Determine cumulative impacts likely to occur as a result of current private, state or federal actions in the analysis area, and from future proposed state actions in the analysis area that are under MEPA review (scoped) or permitting review by any state agency.

None

IV. IMPACTS ON THE HUMAN POPULATION

- *RESOURCES potentially impacted are listed on the form, followed by common issues that would be considered.*
- *Explain POTENTIAL IMPACTS AND MITIGATIONS following each resource heading.*
- *Enter "NONE" If no impacts are identified or the resource is not present.*

14. HUMAN HEALTH AND SAFETY:
Identify any health and safety risks posed by the project.

Human health would not be impacted by the proposed timber sale or associated activity. There are no unusual safety considerations associated with the proposed timber sale.

15. INDUSTRIAL, COMMERCIAL AND AGRICULTURE ACTIVITIES AND PRODUCTION:
Identify how the project would add to or alter these activities.

Timber harvest would provide continuing industrial production in the Plains area. Improvements to big game habitat should provide increased recreational opportunities.

16. QUANTITY AND DISTRIBUTION OF EMPLOYMENT:
Estimate the number of jobs the project would create, move or eliminate. Identify cumulative effects to the employment market.

People are currently employed in the wood products industry in the region. Due to the relatively small size of the timber sale program, there would be no measurable cumulative impact from this proposed action.

17. LOCAL AND STATE TAX BASE AND TAX REVENUES:
Estimate tax revenue the project would create or eliminate. Identify cumulative effects to taxes and revenue.

People are currently paying taxes from the wood products industry in the region. Due to the relatively small size of the timber sale, there would be no measurable cumulative impact from this proposed action on tax revenues.

18. DEMAND FOR GOVERNMENT SERVICES:
Estimate increases in traffic and changes to traffic patterns. What changes would be needed to fire protection, police, schools, etc.? Identify cumulative effects of this and other projects on government services

Log trucks hauling to the purchasing mill would result in temporary increases in traffic on Road #7512 (County Road), Highway 200 and the ACM Road # 56, if the alternative north/south haul route is used. This increase is a normal contributor to the activities of the local community and industrial base and cannot be considered a new or increased source.

19. LOCALLY ADOPTED ENVIRONMENTAL PLANS AND GOALS:

List State, County, City, USFS, BLM, Tribal, and other zoning or management plans, and identify how they would affect this project.

On June 17, 1996, the Land Board approved the State Forest Land Management Plan (SFLMP). The SFLMP provides the philosophy adopted by DNRC through programmatic review (DNRC, 1996). The DNRC will manage the lands in this project according to this philosophy, which states:

> *Our premise is that the best way to produce long-term income for the trust is to manage intensively for healthy and biological diverse forests. Our understanding is that a diverse forest is a stable forest that will produce the most reliable and highest long-term revenue stream… In the foreseeable future, timber management will continue to be our primary source of revenue and our primary tool for achieving biodiversity objectives.*

On March 13, 2003, the DNRC adopted Administrative Rules for Forest Management (Rules) (Administrative Rules of Montana [ARM] 36.11.401 through 450). The Rules provide DNRC personnel with consistent policy, direction, and guidance for the management of forested trust lands. Together, the SFLMP and Rules define the programmatic framework for this project.

20. ACCESS TO AND QUALITY OF RECREATIONAL AND WILDERNESS ACTIVITIES:

Identify any wilderness or recreational areas nearby or access routes through this tract. Determine the effects of the project on recreational potential within the tract. Identify cumulative effects to recreational and wilderness activities.

The area is hunted frequently. Roads through the area that will be closed after the project only access the immediate area, closure of them will not affect the ability of people to recreate on these parcels. The DNRC has cabin site leases in the vicinity of the project area. None of the cabin sites will be directly involved in any of the proposed actions. Recreational areas and wilderness are not accessed through this tract. Use is expected to remain the same following this project.

21. DENSITY AND DISTRIBUTION OF POPULATION AND HOUSING:

Estimate population changes and additional housing the project would require. Identify cumulative effects to population and housing.

There would be no measurable cumulative impacts related to population and housing due to the relatively small size of the timber sale, and the fact that people are already employed in this occupation in the region.

22. SOCIAL STRUCTURES AND MORES:

Identify potential disruption of native or traditional lifestyles or communities.

No impacts related to social structures and mores would be expected under either alternative.

23. CULTURAL UNIQUENESS AND DIVERSITY:

How would the action affect any unique quality of the area?

No impacts related to cultural uniqueness and diversity would be expected under either alternative.

24. OTHER APPROPRIATE SOCIAL AND ECONOMIC CIRCUMSTANCES:

Estimate the return to the trust. Include appropriate economic analysis. Identify potential future uses for the analysis area other than existing management. Identify cumulative economic and social effects likely to occur as a result of the proposed action.

Costs, revenues and estimates of return are estimates intended for relative comparison of alternatives. They are not intended to be used as absolute estimates of return. The estimated stumpage is based on comparable sales analysis. This method compares recent sales to find a market value for stumpage. These sales have similar species, quality, average diameter, product mix, terrain, date of sale, distance from mills, road building and logging systems, terms of sale, or anything that could affect a buyer's willingness to pay for. The effect of the proposed

project would generate an estimated return to the school trust of $1,300,000 in the Alternative Action. The No Action alternative does not generate any return to the trust at this time.

EA Checklist Prepared By:	**Name:** David Olsen	**Date:**	1/30/2007
	Title: Forest Management Supervisor		

V. FINDING

25. ALTERNATIVE SELECTED: The Action Alternative is selected for implementation

26. SIGNIFICANCE OF POTENTIAL IMPACTS: After thorough review of this environmental analysis, the action alternative is found to meet all stated objectives without creating significant impacts. The No Action Alternative does not meet stated project objectives, nor does it address existing conditions concerning forest health and increased risk of wildfire, both of which were identified as issues within this document.

27. NEED FOR FURTHER ENVIRONMENTAL ANALYSIS:

[ ]	EIS	[ ]	More Detailed EA	[X]	No Further Analysis

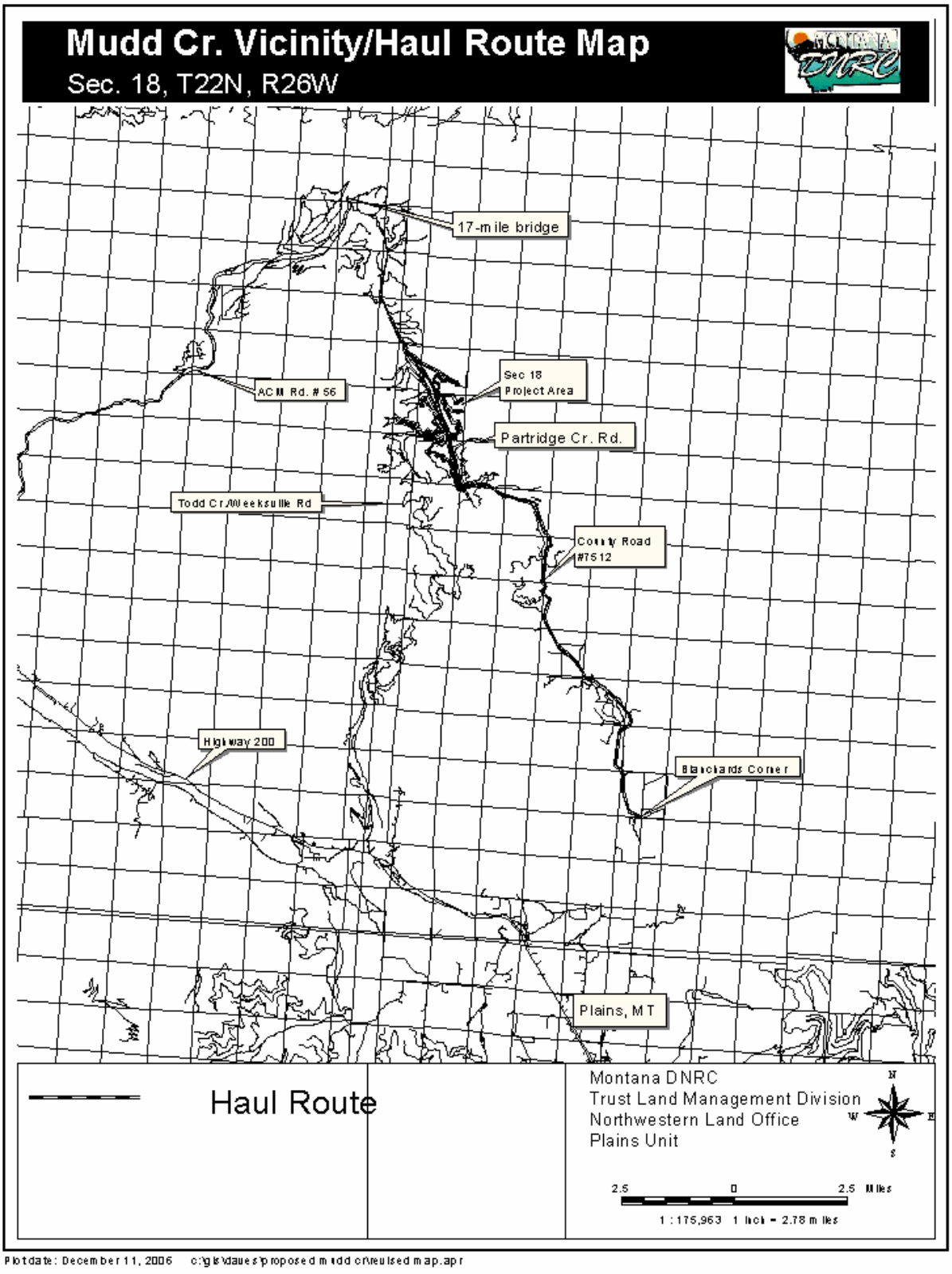
EA Checklist Approved By:	**Name:** Larry Ballantyne		
	Title: Plains Unit Resource Program Manager		
Signature:	L Ballantyne	**Date:**	January 31, 2007

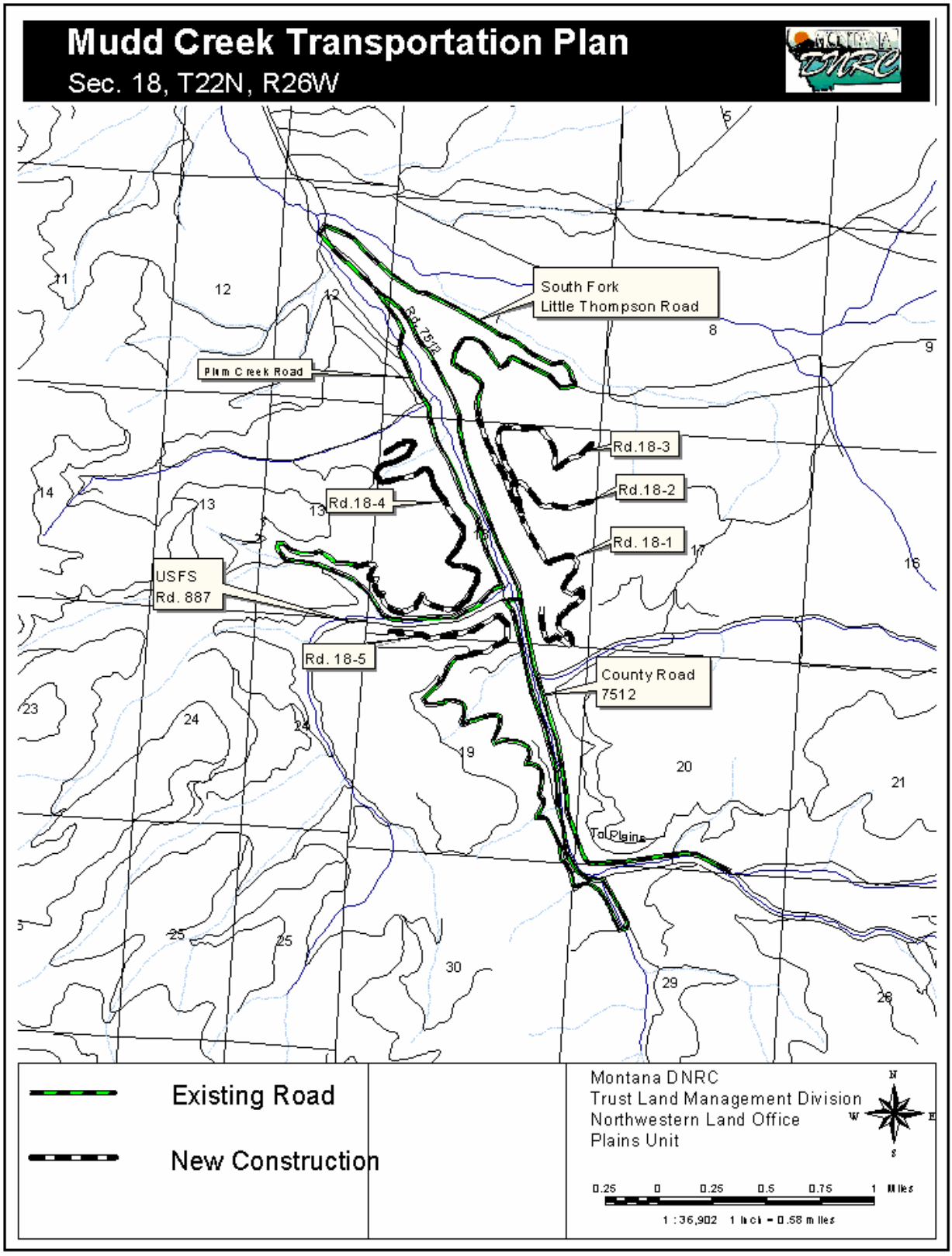
Attachment 1

Sale & Access Maps

Harvest Units and Travel Plan

Cover Types


Mudd Cr. Vicinity/Haul Route Map
Sec. 18, T22N, R26W
17-mile bridge
ACM Rd. # 56
Sec 18
Project Area
Partridge Cr. Rd.
Todd Cr./Weeksville Rd
County Road
#7512
Highway 200
Blanchards Corner
Plains, MT
Haul Route
Montana DNRC
Trust Land Management Division
Northwestern Land Office
Plains Unit
N
W
E
S
2.5
0
2.5 Miles
1 : 175,963 1 inch = 2.78 miles
Plot date: December 11, 2006 c:\gis\daues\proposed mudd cr\revised map.apr


Mudd Creek Transportation Plan
Sec. 18, T22N, R26W
South Fork
Little Thompson Road
Rd. 7512
Plum Creek Road
Rd.18-3
Rd.18-2
Rd.18-4
Rd. 18-1
USFS
Rd. 887
Rd. 18-5
County Road
7512
Tol Plains
Existing Road
New Construction
Montana DNRC
Trust Land Management Division
Northwestern Land Office
Plains Unit
0.25 0 0.25 0.5 0.75 1 Miles
1 : 36,902 1 inch = 0.58 miles
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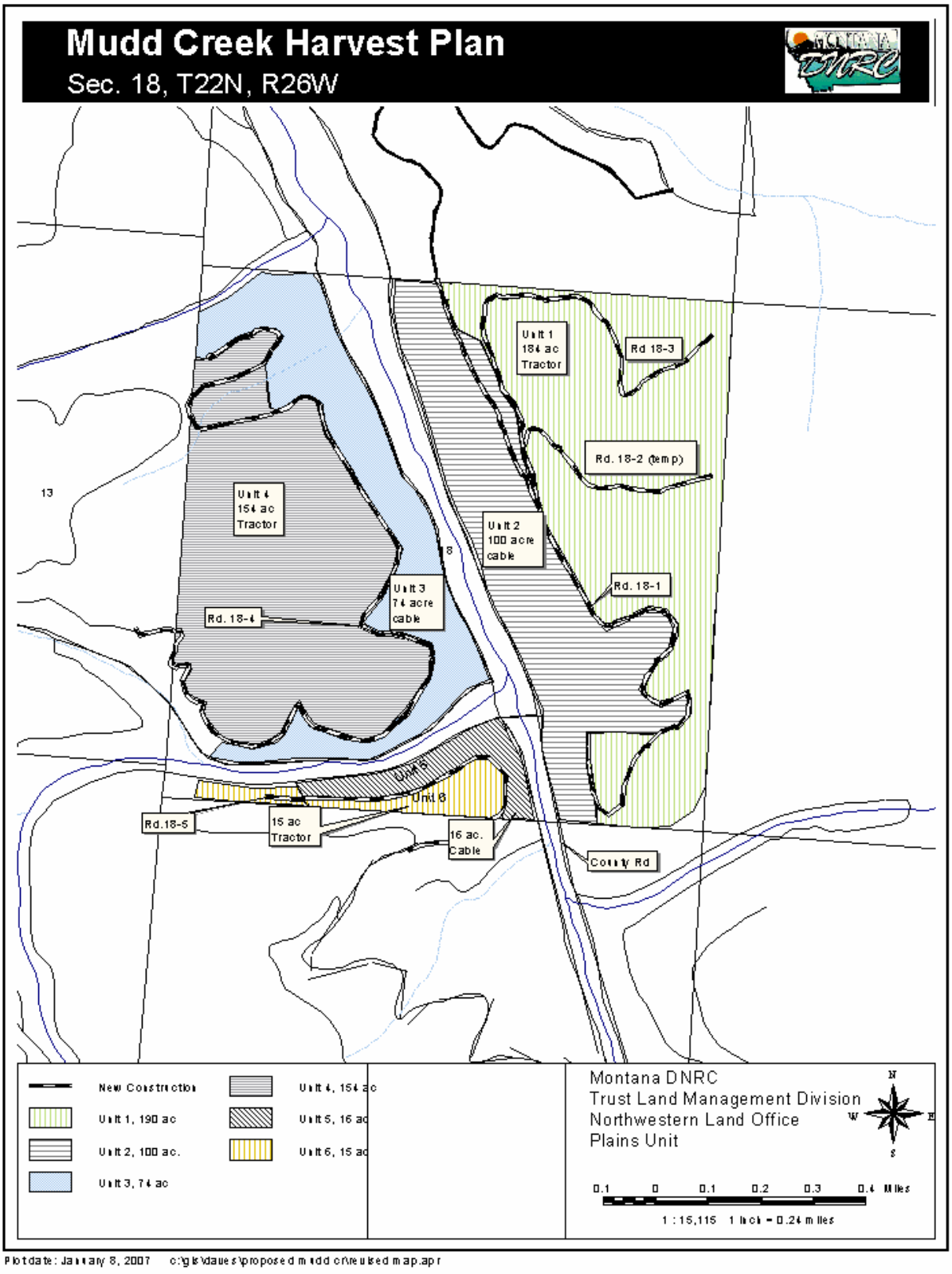

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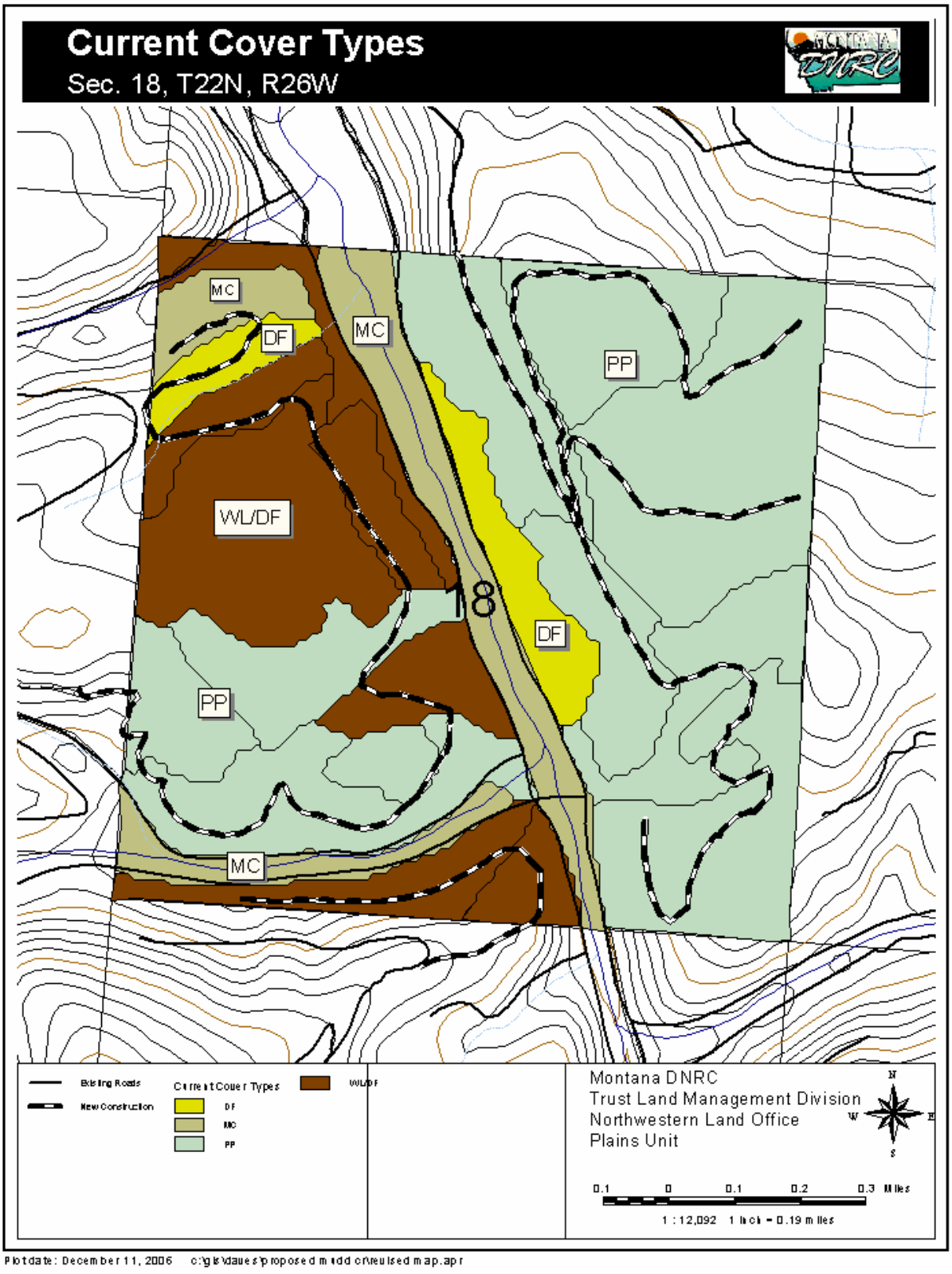
Current Cover Types
Sec. 18, T22N, R26W
MC
DF
MC
PP
WL/DF
18
DF
PP
MC
Existing Roads
New Construction
Current Cover Types
DF
MC
PP
WL/DF
Montana DNRC
Trust Land Management Division
Northwestern Land Office
Plains Unit
N
W
E
S
0.1 0 0.1 0.2 0.3 Miles
1 : 12,092 1 inch = 0.19 miles
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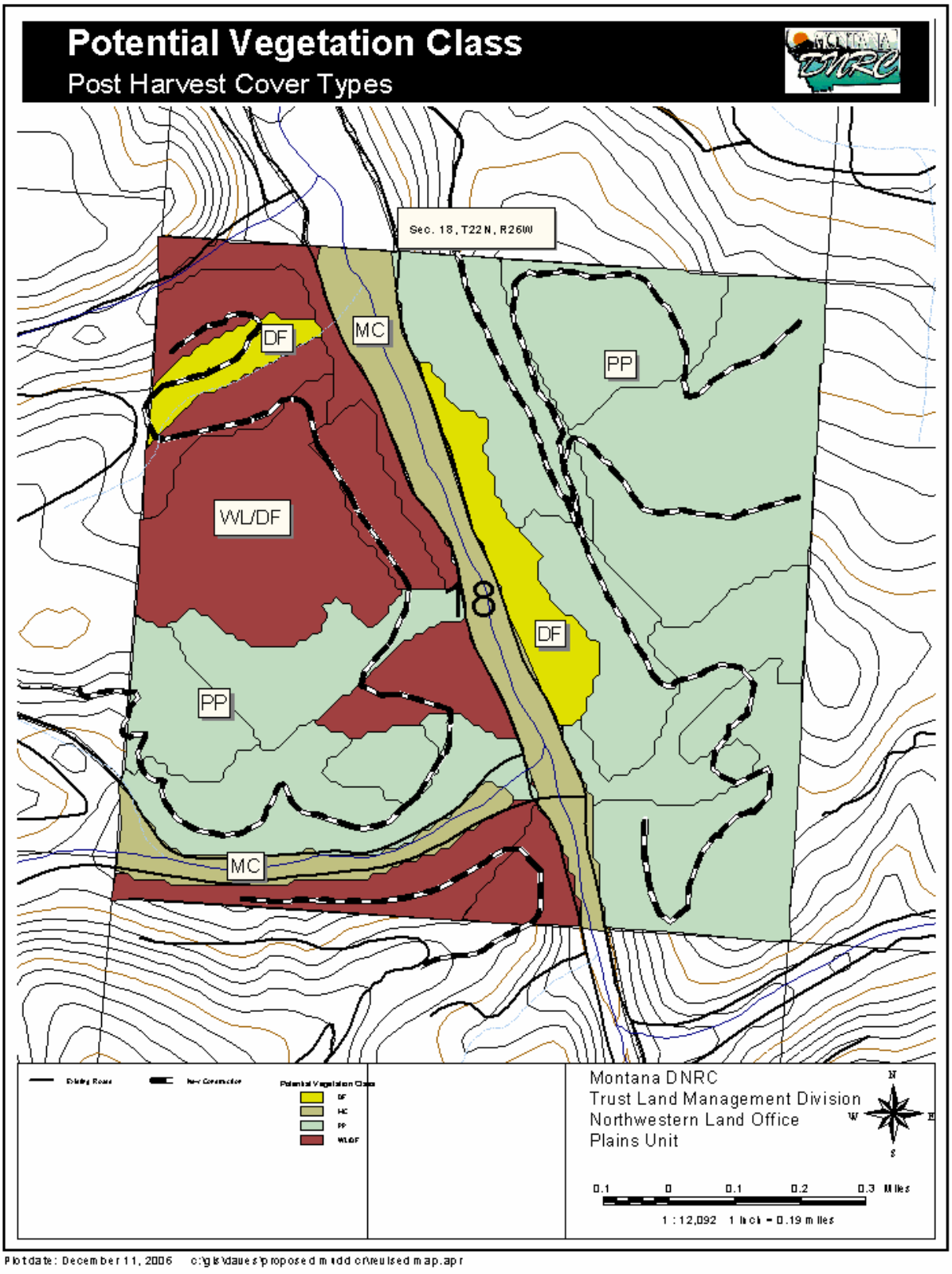

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TABLE 1

Mudd Creek Project Covertype Comparative Table

	SLI Current Cover Types	SLI Pot. Veg. Cover Types	Post Project Cover Types	Net Change
MC	**77**	**27**	**62**	**-15**
PP	**368**	**368**	**368**	**0**
WL/DF	**160**	**210**	**175**	**+15**
DF	**35**	**35**	**35**	**0**
Total Acres	**640**	**640**	**640**	

Cover Types: MC = mixed conifer, PP =ponderosa pine, WL/DF = western larch/Douglas-fir, DF = Douglas-fir.
***Data was compiled from DNRC's 2006 Stand Level Inventory.**

TABLE 2
Plains Unit Cumulative Effects on Covertypes

Cover Type	Estimated Historic Pot. Veg. Acres	Current Acres	Post Project Acres	Net Change Acres
ALP	**179**	**692**	**692**	**0**
DF	**2,261**	**1,865**	**1,865**	**0**
HW	**110**	**110**	**110**	**0**
LPP	**2,763**	**3,578**	**3,578**	**0**
MC	**1,479**	**8,220**	**8,205**	**-15**
PP	**27,948**	**28,198**	**28,198**	**0**
WL/DF	**17, 686**	**9,417**	**9,432**	**+15**
WWP	**366**	**306**	**306**	**0**
NSTDK	**evenly distributed by type**	**400**	**400**	**0**
Total	**52,795**	**52,795**	**52,795**	

Attachment 2

Resource Analysis

Page #

Vegetation Analysis

Introduction

This analysis is designed to disclose the existing condition of the vegetative resource and display the anticipated effects that would result from each alternative of this proposal. During the initial scoping, issues were developed by the public and internally regarding vegetative concerns. The following concerns were expressed from these comments regarding proposed timber harvesting and related activities:

- Concern regarding impacts to threatened, endangered and sensitive plant and animal species (TES).
- Aesthetics: There are concerns that harvesting activities would reduce the visual quality along the County Road and State Lease Cabin sites.
- Fire Ecology: There is concern that the exclusion of fire from the site has changed stand compositions, and age classes from what would have historically occurred in the area. There is also concern that forest fuels have accumulated to a point that would leave this area predisposed to a catastrophic fire event.
- Forest Health: There are concerns that endemic populations of diseases and insects are increasing on the site and have the potential to reach epidemic proportions or reduce productivity.

Analysis Area

The analysis area for direct and indirect effects to vegetation is the state Section 18, Township 22N, Range 26W referred to as the Mudd Creek parcel. Cumulative impacts are considered at the scale of the Plains Unit.

Analysis Method

The Plains Unit typically prepares two to four timber sales per year. Each project is evaluated for its potential effects on lands managed by the DNRC and the surrounding landscape. Methods used in the analysis included review of stand level inventory (SLI) data, field visits, review of scientific literature, aerial photography, and consultation with other professionals.

Existing Condition

Past and current events have changed the forest conditions on the proposed area from what would have been present historically according to Losensky's "Historical Vegetation of Montana" (1997). The area was historically characterized by frequent, low-intensity wildfires prior to the early 1900's. Since the early 1900's fire has been virtually excluded from the project area. Logging activities have occurred on the proposed area since the 1940's. Section records show the Mudd Creek parcel has had two timber sales removing 5,213 mbf in 1945 and 6,660 mbf in 1963. There have been numerous commercial Christmas tree permits, the last being issued in 1963. Three timber salvage permits totaling 190.67 mbf were issued between 1977 and 1982. See Attachment 3 "Prescriptions" for detailed descriptions of current vegetative conditions. The previous logging and fire suppression history of these parcels has led to stands that are of the desired potential vegetation class, but have become overstocked and are not regenerating with species consistent with the desired future condition. Current cover types and post harvest stand maps can be seen in Attachment 1, Maps.

All stands within the project area are beginning to show increases in fuel loading as advanced shade tolerant regeneration (Douglas-fir, Grand fir, spruce) has become a green ladder fuel. This type of fuel loading is developing in parts of all stands within the project area. Insect and disease mortality in all stand components is also contributing to dead fuel loading. Within the Mudd Creek parcel, views from

the county road are limited due to a combination of topography and thick understory regeneration which grows along the edge of the road. There is little visual evidence of logging trails, corridors and landings from past management actions on State land, however the parcel is surrounded by private ownership which has been previously harvested and views of past logging are common in the area. (see Mudd Creek Timber Sale Vicinity Map).

The primary insect and disease agents in the stands are infestations of Dwarf mistletoe (*Arceuthobium douglasii & Arceuthobium laricis*), Fir Engraver beetle (*Scolytus ventralis*), Douglas-fir beetle (*Dendroctunus pseudotsugae*) and root rots. The overstory, intermediate components and the overstocked understory are all being affected at a moderate level now, but increasing due to competition from overstocking and advanced age.

Noxious weeds, mainly knapweed, are present throughout the project area, mostly prevalent along open roads and within stand openings.

Direct and Indirect Effects on Activities on Vegetation

No Action Alternative

No timber harvest or associated activities would occur under this alternative. Timber types would continue to advance towards climax conditions with shade tolerant Douglas- fir, grand fir and Engelmann spruce continuing to thrive in the understory. These species have already begun to become dominant and are replacing the ponderosa pine and western larch. Growth and vigor of the trees present in the analysis area would continue to decline as competition for resources increases. Insect and disease would continue on a path from endemic to epidemic as infestation/infection progresses. Noxious weeds would continue to exist along the roads and move into the forested areas as natural disturbances provide available seedbeds.

Action Alternative

The proposed alternative would harvest timber on approximately 600 acres. The harvest would be focused on the removal of shade tolerant trees along with those affected by or susceptible to insect and disease mortality. More detailed information for treatment by individual units can be obtained in Attachment 3,"Prescriptions". The project area would be altered with regard to overall size class distribution and a reduction in stocking levels. Proposed harvest would maintain 368 acres of ponderosa pine and 35 acres of Douglas-fir cover types. Due to deliberate changes in stocking levels of the predominant species caused by harvest prescriptions and marking preferences in the existing mixed conifer stands a change in cover types would occur. Western larch/Douglas-fir cover type, the desired potential vegetation class, would increase by 15 acres, from 160 to 175 acres, while mixed conifer cover types would decrease by 15 acres from 77 to 62 acres. (See Table 1, Cover Type Comparative Table and Cover Type Maps**)**. Through harvest and site preparation activities, fuel loadings would be reduced by the removal of ladder fuels from the understory intermediate components of these stands as well as crown spacing in the intermediate and overstory components. Growth and vigor would increase because residual tree spacing would allow full light to crowns and reduce competition for water. Within the Mudd Creek parcel, views from the county road would change due to logging operations. Logging would create openings, and roads, skid trails, landings and skyline corridors would be visible. The selective harvest prescriptions, the use of skyline yarding systems, and the inclusion of a buffer strip along the main roads should minimize the visual impacts (see Attachment III, Prescriptions).The end result will still be denser and contain larger trees than does most of the surrounding ownership.

The impact would be reduced by using road screening, skid trail and corridor design with the appropriate logging systems.
Noxious weeds may increase in canopy openings and will be monitored and addressed through an integrated pest management plan including chemical and biological control methods. Roads and skid trail approaches would be seeded and spot treated with chemicals following construction and project completion. Prior to entering site, off-road logging equipment would be cleaned and inspected through the timber sale contact to avoid seed migration. Roads would be closed following the sale to avoid migration of weed seed into the area. Post harvest, the area would be included in the Plains Unit's integrated weed management program. Biological, mechanical and chemical methods would be used to control noxious weeds.

Cumulative Effects

No Action Alternative

Under this alternative, stand structure and species composition on State land across the Plains Unit are expected to continue the change towards more shade tolerant species. The No Action Approach would gradually move these stands away from the desired future condition of seral cover types and decreased stocking levels. Fuel loading would be expected to increase and stands would become more susceptible to a stand replacement fire, as well as increased mortality from insects and disease.

Action Alternative

Across the Plains Unit, there would be a slight change toward desired potential vegetation class, because proposed treatments would change 15 acres from mixed conifer to western larch/Douglas-fir cover types. (See Table II, Cover types). Due to road construction, approximately 35 acres would be removed from timber production.

HYDROLOGY ANALYSIS

Introduction

This analysis is designed to disclose the existing condition of the hydrologic resources and display the anticipated effects that may result from each alternative of this proposal. During the initial scoping, issues were identified by the public regarding water quality or quantity. The following issue statements were expressed from internal comments regarding the effects of proposed timber harvesting:

- Timber harvesting and road construction has the potential to increase water yield which in turn may affect stream channel stability
- Timber harvesting and road construction activities may increase sediment delivery into streams and affect water quality.

These issues can best be evaluated by analyzing the anticipated effects of sediment delivery and water yield on the water quality of streams in the project area.

The Environmental Effects sections disclose the anticipated indirect, direct and cumulative effects to water resources within the analysis area from the proposed actions. Past, current, and future planned activities on all ownerships within each analysis area have been taken into account for the cumulative effects analysis.

The primary concerns relating to aquatic resources within the analysis area are potential impacts to water quality from sources outside the channel as well as inside the channel. In order to address these issues the following parameters are analyzed by alternative:

-Miles of new road construction and road improvements
-Potential for sediment delivery to streams
-Increases in ECA and annual water yield

Analysis Method

Sediment Delivery

The methods applied to the project area to evaluate potential direct, indirect and cumulative effects include a field review to look at potential sediment sources from haul routes. Roads were evaluated to determine existing sources of introduced sediment.

Water Yield

Water yield will be disclosed as a cumulative effect in the 'Existing Conditions' portion of this report because the existing condition is a result of all past harvesting and associated activities. In the 'Environmental Effects' portion of this report, water yield increases as a result of this project will be disclosed as a direct effect. The cumulative water yield increase as predicted to include each alternative will be disclosed as a cumulative effect.

The annual water-yield increase for watersheds in the project area was determined using the Equivalent Clearcut Acres (ECA) method as outlined in Forest Hydrology, Part II (Haupt et. al., 1976).

ECA is a function of total area roaded, harvested or burned, percent of crown removed during harvesting or wildfire, and amount of vegetative recovery that has occurred in the harvested or burned areas. As live trees are removed, the water that would have evaporated and transpired either saturates the soil or is translated to runoff. This method also calculates the recovery of these increases as new trees revegetate the site and move toward pre-harvest water use.

In order to evaluate the potential effects of water yield increases, a threshold of concern for each watershed was established per ARM 36.11.423. Thresholds were established based on evaluating the acceptable risk level, resources value, and watershed sensitivity.

Analysis Area

Sediment Delivery

The analysis area for sediment delivery is limited to the harvest units and roads used for hauling. This includes in-channel and upland sources of sediment that could result from this project.

Water Yield and Cumulative Effects

The analysis areas for water yield and cumulative effects are the Todd Creek watershed and the Mudd Creek watershed (see Figure H1: Project Watersheds). Todd Creek is a tributary to Mudd Creek which in turn is a tributary to the Little Thompson River. This is selected as the appropriate scale of analysis due to the size of the project versus the watershed size and the potential for impacts.

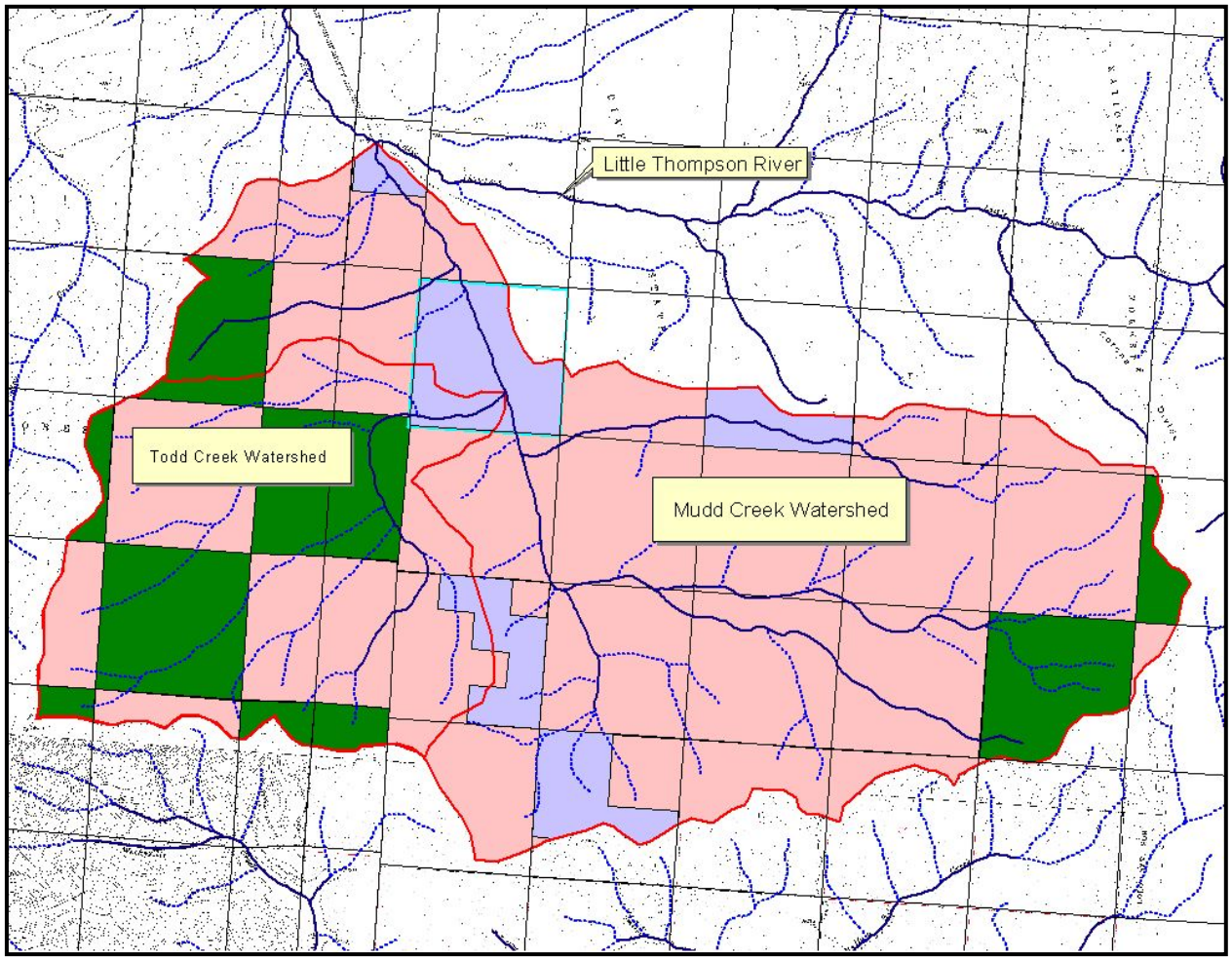


Figure H1: Project Watersheds

Water Uses and Regulatory Framework

Water Quality Standards

This portion of the Clark Fork River basin, including the Mudd Creek watershed is classified as B-1 by the State of Montana Department of Environmental Quality (DEQ), as stated in the Administrative Rules of Montana (ARM 17.30.607). The water quality standards for protecting beneficial uses in B-1 classified watersheds are located in ARM 17.30.623. Water in B-1 classified waterways is suitable for drinking, culinary and food processing purposes after conventional treatment, bathing, swimming and recreation, growth and propagation of salmonid fishes and associated aquatic life, waterfowl and furbearers, and agricultural and industrial water supply. State water quality regulations prohibit any increase in sediment above naturally occurring concentration in water classified B-1. Naturally occurring means condition or materials present from runoff or percolation over which man has no control or from developed land where all reasonable land, soil and water conservation practices have been applied. Reasonable land, soil and water conservation practices include methods, measures or practices that protect present and reasonably anticipated beneficial uses. The State of Montana has adopted Best Management Practices (BMPs) through its non-point source management plan as the principle means of meeting the Water Quality Standards.

Water Quality Limited Waterbodies

Mudd Creek and Todd Creek are not listed as a water quality limited water body in the draft 2006 303(d) list; however the Little Thompson River is listed for not fully supporting aquatic life and cold water fisheries. The 303(d) list is compiled by the Montana Department of Environmental Quality as required by Section 303(d) of the Federal Clean Water Act and the Environmental Protection Agency Water Quality Planning and Management Regulations (40 CFR, Part 130). Under these laws, DEQ is required to identify water bodies that do no fully meet water quality standards, or where beneficial uses are threatened or impaired.

Streamside Management Zone Law (SMZ)

All rules and regulations pertaining to the Streamside Management Zone (SMZ) Law will be followed. An SMZ width of 100 feet is required on Class I and II streams when the slope is greater then 35%. An SMZ width of 50 feet is required when the slope is less than 35%.

Water Rights and Beneficial Users

Water rights for surface water exist downstream of the project area on the Mudd Creek and the Little Thompson River for stock watering and domestic use.

EXISTING CONDITION

Although the USGS topographic map shows two unnamed tributaries to Mudd Creek on the state parcel, scoured streambeds were identified only on Todd Creek and Mudd Creek. No evidence of mass wasting or other large erosion features was identified along these streams.

Todd Creek—

The Todd Creek watershed is a 4,300-acre tributary to the Mudd Creek. The third-order stream flows in a general southwest-to-northeast direction from its headwaters to its confluence with Mudd Creek in the state parcel. Average precipitation in the Todd Creek watershed is estimated at 31 inches per year with a range of 20 to 42 inches per year.

Todd Creek is a perennial class-1 stream with an average bankfull width of approximately 8 feet. This channel exhibits characteristics typical of a Rosgen B stream type (Rosgen, 1996) with a mix of silts, sands, gravels and some cobble for substrate. This stream type is considered relatively stable and is not considered as a high sediment supply stream channel. In this channel type, woody debris is important for pool formation and fisheries habitat. Large woody debris is common throughout the state section which provides cover for westslope cutthroat trout and eastern brook trout (MFISH, Bowers, pers comm).

Roads have been constructed on both sides of Todd Creek within the state parcel. Generally, one of the roads is within 50 feet of the stream depending upon the meander pattern of the stream. At one location, the road is within 35 feet of the stream. No evidence of direct sediment delivery was found from either road during field reconnaissance. A tributary to Todd Creek enters the state parcel from the west. The road along this channel is generally greater than 50 feet from the stream, but at one location the stream is within 15 feet of the road fill. No direct delivery from this location was noted during field review.

Approximately 400 feet above the confluence with Mudd Creek, a culvert has been installed for a road crossing. The existing CMP is short and undersized for high flow events as evidenced by a large scour hole at the CMP outlet and increased levels of fine sediment immediately downstream of the crossing. Bank trampling by cattle and wildlife around the crossing structure has likely contributed to the increased sediment levels.

Mudd Creek—
Mudd Creek watershed is a 14,015-acre tributary to the Little Thompson River. The fourth-order stream flows in a general south-to-north direction from its forested headwaters on Plum Creek Timber Company and Lolo National Forest lands. Average precipitation is approximately 27 inches per year with a range of 20 to 42 inches per year.

Mudd Creek is a perennial class-1 stream with an average bankfull width of approximately 13 feet. The channel exhibits characteristics of a Rosgen “C” and “B” stream types with a moderate width-to-depth ratio, moderate level of meandering and low entrenchment. Substrate consists of silts, sands and gravels with occasional cobbles. This channel has been heavily influenced by beavers downstream of the Todd Creek confluence. The beaver dams provide sediment storage in the channel until the blockage is compromised and the stored sediment is flushed. The deep pools created by the beavers provide abundant habitat for eastern brook trout throughout the state section. Riparian vegetation is generally intact throughout the state parcel, although evidence of some timber harvest is present.

The east side of Mudd Creek is paralleled with the county road. At one location, the county road is within 25 feet of the stream. A forest road runs parallel to stream on the west side of the creek, although this road is generally greater than 100 feet from the channel. One road crossing exists on the state parcel. No direct sediment delivery to the stream was found at this site. Downstream of the state parcel, a second stream crossing exists that is undersized in diameter and CMP length. As with the crossing on Todd Creek, a large scour hole exists at the CMP outlet.

Cumulative Effects

Harvest in the Mudd Creek watershed has occurred since the 1940’s although the heaviest level of harvesting took place in the 1970’s and 1980’s (pers comm). A harvest history was developed for the Todd Creek and Mudd Creek watersheds from aerial photos to estimate the annual water yield increases (AWYI) for each watershed. Using the ECA method described earlier, the existing AWYI for Todd Creek watershed is estimated at 10% over a fully forested condition, while the existing AWYI for Mudd Creek is estimated at 12.4% over a fully forested condition.

After reviewing the beneficial uses, existing channel conditions and existing watershed condition per ARM 36.11.423, the threshold of concern for both watersheds was set at 14% over a fully forested condition.

ENVIRONMENTAL EFFECTS

Description of Alternatives

No Action Alternative

No timber harvest or associated activities would occur under this alternative. Existing activities such as recreational use, livestock grazing and firewood gathering would continue

Action Alternative

Six units totaling approximately 549 would be commercially harvested under the Action Alternative. Approximately 359 acres would be harvested using conventional ground-based equipment while the remaining 190 acres would be treated using cable methods. In addition, approximately 6.2 miles of new road would be constructed, 0.5 miles of road would be reconstructed and approximately 7 miles of road would be maintained or have minor drainage improvements installed as necessary to meet BMPs. Included in this would be the removal of one crossing on Todd Creek and, potentially, the replacement of one undersized crossing on Mudd Creek. Harvest may be completed under summer or winter conditions. Existing activities such as recreational use, livestock grazing and firewood gathering would continue.

Direct and Indirect Effects

No Action Alternative

Under this alternative, no timber harvest or related activities would occur. The existing sediment source at the road crossing on Todd Creek would remain with continued risk of sediment delivery to Todd Creek and subsequently Mudd Creek.

Action Alternative

If this alternative were selected, approximately 549 acres would be harvested using conventional ground-based and cable yarding methods. ECA generated from these activities would increase the modeled annual water yield by an estimated 0.4% in the Todd Creek watershed and 0.9% in the Mudd Creek watershed.

Removing the stream crossing on Todd Creek would result in a moderate potential for short-term sediment delivery, however this potential would be reduced with mitigation such as sediment fence and slash filter windrows. If all landowners are agreeable to the replacement of the CMP on Mudd Creek, some short-term sediment delivery associated with culvert installation in Mudd Creek would likely result from the implementation of this alternative. Both stream crossings would require a Stream Protection Act permit (124 Permit) from Montana Fish, Wildlife and Parks and a Short-term Water Quality Standard Exemption for turbidity from the Department of Environmental Quality (318 authorization).

Past monitoring of DNRC timber harvest has shown erosion on approximately 6% of the sites monitored (DNRC, 2004). The erosion was attributed to inadequate skid trail drainage, although water quality impacts from the erosion were not noted. Timber harvesting under this alternative would take place on both steep and level terrain. To reduce the risk of soil displacement and the potential for erosion from steep slopes, ground-based harvest methods will be limited to slopes of 40% or less. Skid trails would require drainage features to be approved by a DNRC sale administrator. No timber harvest from SMZs would occur nor would equipment be operated between the roads along either stream.

The proposed road construction does not include new stream crossings. All construction would occur well away from streams on soils that are well drained, although droughty (Collins, 1985). Because revegetation may be difficult on the road fill, erosion may occur, but due to the distance from streams, sediment delivery and subsequent water quality impacts are not likely to occur.

Because DNRC would incorporate BMPs into the project design as required by ARM 36.11.422 (2), and all laws pertaining to SMZs would be followed, sediment from timber harvest would not be expected to enter streams in the project area and therefore the risk of long-term adverse direct or indirect effects to water quality or beneficial uses would be low.

Cumulative Watershed Effects

No Action Alternative

Under the no action alternative the potential for sediment contribution from the proposed haul route and would still exist, however, no additional cumulative effects would be expected.

Action Alternative

Considering the existing conditions and direct/indirect effects for annual water yield increases in the Todd and Mudd Creek watersheds, DNRC estimates the annual water yield increases to remain below the thresholds of concern. By maintaining the AWYI below the threshold, the risk for adverse impacts such as channel destabilization and excessive in-stream erosion would be low.

Cumulative effects to sediment delivery from roads would be reduced because the undersized crossings would be replaced or removed. Although new road construction would be implemented, no new stream crossings would exist and therefore a risk of prolonged sediment delivery from an additional crossing would not result. Short-term turbidity increases during culvert removal on Todd Creek and the potential culvert replacement on Mudd Creek would be minimized with BMP's and mitigation measures required by relevant permitting agencies.

Because the annual water yield increases would remain below the thresholds of concern and BMP's would be implemented during timber harvest and road construction operations, the risk of adverse cumulative impacts to water quality and beneficial uses would be low.

REFERENCES

Collins, Jeff and Ottersberg, R. 1985. Plains Unit Soil Survey. Montana Department of State Lands. Missoula, MT.

DNRC, 2004. DNRC Compiled Soils Monitoring Report on Timber Harvest Projects. Missoula, MT

Haupt, H.F., et al., 1974. Forest Hydrology Part II Hydrologic Effects of Vegetation Manipulation. USDA Forest Service, Region 1. Missoula, Montana.

Rosgen, D. L.1996. Applied River Morphology. Wildland Hydrology, Pagosa Springs, CO

FISHERIES ANALYSIS

Introduction

This analysis is designed to disclose the existing condition of the fisheries resources and display the anticipated effects that may result from each alternative of this proposal. During the initial scoping, comments were received by the public regarding fisheries. The following issues were expressed regarding the effects of proposed timber harvesting:

- Timber harvesting and road construction activities may affect fish habitat by increasing sediment delivery to streams and decreasing levels of recruitable woody debris.

These issues can best be evaluated by analyzing the anticipated effects of sediment delivery on fish habitat in the project area and the amount of woody debris available for recruitment pre- and post-harvest.

Analysis Area

Sediment Delivery

The analysis area for sediment delivery is limited to the harvest units and roads used for hauling. This includes in-channel and upland sources of sediment that could result from this project.

Woody Debris Recruitment

The analysis area for woody debris is the portion of the state parcel that is adjacent to a fish-bearing stream.

Cumulative Effects

The cumulative effects analysis area for sediment delivery is limited to the harvest units and roads used for hauling. This includes in-channel and upland sources of sediment that could result from this project. The cumulative effects analysis area for woody debris recruitment is the portion of the state parcel(s) that are adjacent to a fish-bearing stream.

Analysis Methods

Expected effects to fisheries habitat will be addressed qualitatively using the current condition as a baseline disclosing the expected changes due to the alternatives proposed.

Sediment Delivery

The analysis methods for sediment delivery will mimic those used in the Hydrology portion of this report.

Woody Debris Recruitment

The analysis method for woody debris recruitment will evaluate the potential reduction in available woody debris due to timber harvest activities.

EXISTING CONDITION

According to the Montana Fisheries Information System (MFISH) on the Natural Resources Information Service, Mudd Creek and Todd Creek both contain westslope cutthroat trout. MFISH also notes that eastern brook trout inhabit Mudd Creek. During August 2006, the DNRC fisheries biologist surveyed a small tributary to Todd Creek in the southwest corner of the section and found both westslope cutthroat trout and eastern brook trout. Because eastern brook trout were found in the tributary to Todd Creek, it is reasonable to assume that this species is found throughout the Todd Creek drainage.

Population estimates of fish were not available for these streams; however MFISH indicates a 'rare' abundance estimate for westslope cutthroat trout and a 'common' abundance estimate for eastern brook trout in Mudd Creek. No abundance estimates were available for Todd Creek.

Sediment delivery

Potential sediment sources from roads, stream crossings and in-channel sources were identified during field reconnaissance. All sediment sources identified as part of the existing condition are discussed in the Hydrology Analysis portion of this EA.

Woody Debris Recruitment

Todd Creek-

Todd Creek flows west-to-east through the state parcel between two roads. Generally, one of the roads is within 50 feet of the stream depending upon the meander pattern of the stream. At one location, the road is within 35 feet of the stream. Although past harvest has occurred along the stream, the existing condition includes a fully stocked stand of western larch, Douglas-fir, Engleman spruce and grand fir. Tree age varies within the riparian corridor from 10 to over 200 years. Woody debris in the channel is common throughout the state parcel.

A tributary to Todd Creek enters the state parcel from the west. The road along this channel is generally greater than 50 feet from the stream, but at one location the stream is within 15 feet of the road fill. No direct delivery from this location was noted during field review.

Mudd Creek-

Mudd Creek flows south-to-north between a forest road to the west and a county road on the east. Through the state parcel, the forest road is generally more than 100 feet from the stream. The county road is within 50 feet of the stream in a few locations and at on location is within 25 feet of the stream. Vegetation between the roads is comprised of lodgepole pine, Engelmann spruce, Douglas-fir, western larch and grand fir. Although some large stumps are visible from past harvest, this is a fully stocked stand similar to the Todd Creek corridor.

To delineate the Riparian Management Zone (RMZ) as required by ARM 36.11.425 (5), site potential tree heights (SPTH) were determined along the Mudd and Todd Creeks. The SPTH on DNRC managed lands was determined to be approximately 85 feet using regional index curves.

ENVIRONMENTAL EFFECTS

This section discloses the anticipated indirect, direct, and cumulative effects to fisheries within the affected environment from proposed actions. Past, current, and activities on all ownerships within the analysis areas described above have been taken into account for the cumulative effects analysis as well as future planned state actions.

The primary concerns relating to fisheries within the affected environment are (1) potential impacts to water quality from sources outside the channel as well as inside the channel; and, (2) adequate woody debris recruitment. In order to address these issues the following parameters are analyzed by alternative:

-Miles of new road construction and new stream crossings on fish bearing streams
-Potential for sediment delivery to streams
-Changes in recruitable woody debris.

Description of Alternatives

No Action Alternative

No timber harvest or associated activities would occur under this alternative. Existing activities such as recreational use, livestock grazing and firewood gathering would continue

Action Alternative

Six units totaling approximately 549 would be commercially harvested under the Action Alternative. Approximately 359 acres would be harvested using conventional ground-based equipment while the remaining 190 acres would be treated using cable methods. In addition, approximately 6.2 miles of new road would be constructed, 0.5 miles of road would be reconstructed and approximately 7 miles of road would be maintained or have minor drainage improvements installed as necessary to meet BMPs. Included in this would be the removal of one crossing on Todd Creek and the potential replacement of one undersized crossing on Mudd Creek. Harvest may be completed under summer or winter conditions. No harvesting would occur within the SMZ of Todd or Mudd Creek.

Direct and Indirect Effects

No Action Alternative

Sediment Delivery

Under this alternative, no timber harvest or related activities would occur. Potential sediment sources that currently exist would remain.

Woody Debris Recruitment

No timber harvest would occur in riparian zones under this alternative; therefore changes to riparian stands would be driven by natural events.

Action Alternative

Sediment Delivery

As disclosed in the Hydrology Analysis, stream crossing removal on Todd Creek and the potential CMP replacement on Mudd Creek would result in short-term sediment delivery to these streams, however, the extent of this short-term impact would be reduced with mitigation such as sediment fence and slash filter windrows.

Both stream crossings would require a Stream Protection Act permit (124 Permit) from Montana Fish, Wildlife and Parks and a Short-term Water Quality Standard Exemption for turbidity from the Department of Environmental Quality (318 authorization).

Because DNRC would incorporate BMP's into the project design as required by ARM 36.11.422 (2), and all laws pertaining to SMZ's would be followed, the risk of sediment delivery to streams in the project area is expected to be low, and therefore the risk of long-term adverse direct or indirect effects to water quality or beneficial uses--including fisheries--would be low.

Woody Debris Recruitment

Because no timber harvest is proposed within the SMZ of Todd Creek or Mudd Creek, all existing trees within the SMZ would remain as recruitable woody material. The loss of potential recruitable woody debris from outside of the SMZ is expected to occur. However, woody debris recruitment rates to streams are much higher from within an SMZ rather than from outside an SMZ, and all recruitable woody debris within the SMZ would be retained. This alternative would be expected to result in a low risk of detrimental, impacts to channel form, function and fisheries habitat.

Cumulative Effects

No Action Alternative

No timber harvest or road construction is associated with this alternative. Existing sediment sources would continue to contribute sediment to streams until remedial action were implemented or natural healing occurs. No additional cumulative effects would result from the implementation of this alternative.

Action Alternative

Sediment Delivery

As disclosed in the Hydrology Analysis, cumulative effects to sediment delivery from roads would be reduced because of BMP implementation, potential stream crossing improvements and CMP removal. Although new road construction would be implemented, no new stream crossings would exist and therefore a risk of prolonged sediment delivery from an additional crossing would not result. Short-term turbidity increases during culvert installation and removal would be minimized with BMP's and mitigation measures required by relevant permitting agencies.

Because BMP's would be implemented during timber harvest and road construction operations, the risk of adverse cumulative impacts to water quality and beneficial uses as a result of this alternative would be low.

Woody Debris Recruitment

Cumulative effects to recruitable woody debris would include a limited potential for reduction in the available woody debris due to timber harvest. This would occur from trees outside of the SMZ. Because no harvest would occur within 50 feet of a fish-bearing stream expects remaining recruitable woody debris to be an adequate amount to maintain fisheries habitat.

Because of the (1) low risk of detrimental cumulative impacts to water quality and beneficial uses from sediment delivery, and (2) limited potential for decreased woody debris recruitment, the risk detrimental cumulative impacts to fisheries habitat and populations from the action alternative would be low.

REFERENCES

MFISH (Montana Fisheries Information System). 2005. Montana Fish, Wildlife and Parks, Montana Natural Resource Information System.

SOILS ANALYSIS

Introduction

This analysis is designed to disclose the existing condition of the soil resources and display the anticipated effects that may result from each alternative of this proposal. During the initial scoping, issues were identified by the public regarding soil impacts. The following issue statement was expressed from comments regarding the effects of proposed timber harvesting:

- Timber harvest activities may result in reduced soil productivity and increased erosion due to compaction and displacement, depending on area and degree of harvest effects.

Other comments regarding unstable soils were expressed. However, after reviewing the Plains Unit Soil Survey (Collins & Ottersberg, 1985) no unstable soils were identified in the project area and therefore will not be further discussed.

Analysis Area

The analysis area for soil impacts will be the harvest units. This analysis area will adequately allow for disclosure of existing conditions, direct, indirect and cumulative impacts.

Analysis Methods

Methods for disclosing impacts include using general soil descriptions and the management limitations of the landtype and then qualitatively assessing the risk of negative effects to soil productivity from compaction and displacement from each alternative. While the anticipated impacts from each alternative will disclose the direct/indirect effects, the cumulative impacts will be the result of previous and proposed activities.

EXISTING CONDITIONS

General Conditions

The Plains Unit Soil Survey combines landform and soil quality information with habitat types to inventory and map soils in the project area. Four landtypes were identified in the project area, although harvest activities are proposed on three landtypes. Table ST-1 provides a brief description of the landtypes within the project area while Figure SF-1 provides a visual depiction of the landtype locations.

Table ST-1: Project Area Landtype Descriptions

Soil Description			Management Implications (erosion hazard)	
Landtype	Name	Soil & Vegetation Descriptions	Erosion Potential	Comments
10U-D	Alluvial Lands 0-10% slopes	Well-drained soils, comprised of coarse gravelly sandy and cobbly loams. Some localized wet habitats may occur in swales. Fluctuating water table can lead to occasional flooding during snowmelt.	Bare soils have a moderate erosion potential. Sediment delivery potential is moderate except on steeper banks near streams.	No timber harvest proposed on this landtype.
15U-8D	Co-Alluvial Footslopes 20-40% slopes	Soils are deep (15-20 inches) and well-drained. Subsurface soils are gravelly to very gravelly, cobbly loams. Vegetaion is generally Douglas-fir with grand fir inclusions associated with swales.	Soil erosion and sediment delivery efficiency is moderate. Erosion on roads and trails can be controlled with standard drainage.	Timber productivity potential is moderate. Well suited for tractor operations. Due to high amount of stone and boulders, roads are generally rough.
30U-8C	Mountain Sideslopes 20-40% slopes	Soils are deep and well drained. Consists of residual rock mixed with gravels and cobbles. Major habitat type is Douglas fir on south slopes and grand fir on north slopes and moist swales.	Soil erosion and sediment delivery efficiency is moderate. Erosion on roads and trails can be controlled with standard drainage.	Timber productivity potential is moderate to high. Season of use is typically long. Droughty soils may be difficult to revegetate on cut- and fillslopes.

60	Fluvial Breaklands 60% slopes	Soils are excessively well drained, loamy skeletal textured and shallow to moderately deep (5-10 inches). Vegetation is generally Ponderosa pine, Douglas-fir and grasslands.	Angular rock content in soils contributes to a low to moderate erosion hazard on roads. Sediment delivery efficiency is high due to the steep terrain.	Potential for sediment delivery is high and will require management considerations such as cable logging and special road construction methods.

The Plains Unit is dominated by partially metamorphic, sedimentary rocks from the 600-million year old Belt Supergroup. The project area is within the Wallace Formation that encompasses the foothills and lower mountain slopes from Plains to the Thompson Lakes. Rocks in this formation are generally comprised of argillites, quartzites and siltites. Overlying these sediments is a layer of loess influenced volcanic ash deposited and redeposited from Mount Mazama approximately 6700 years ago.

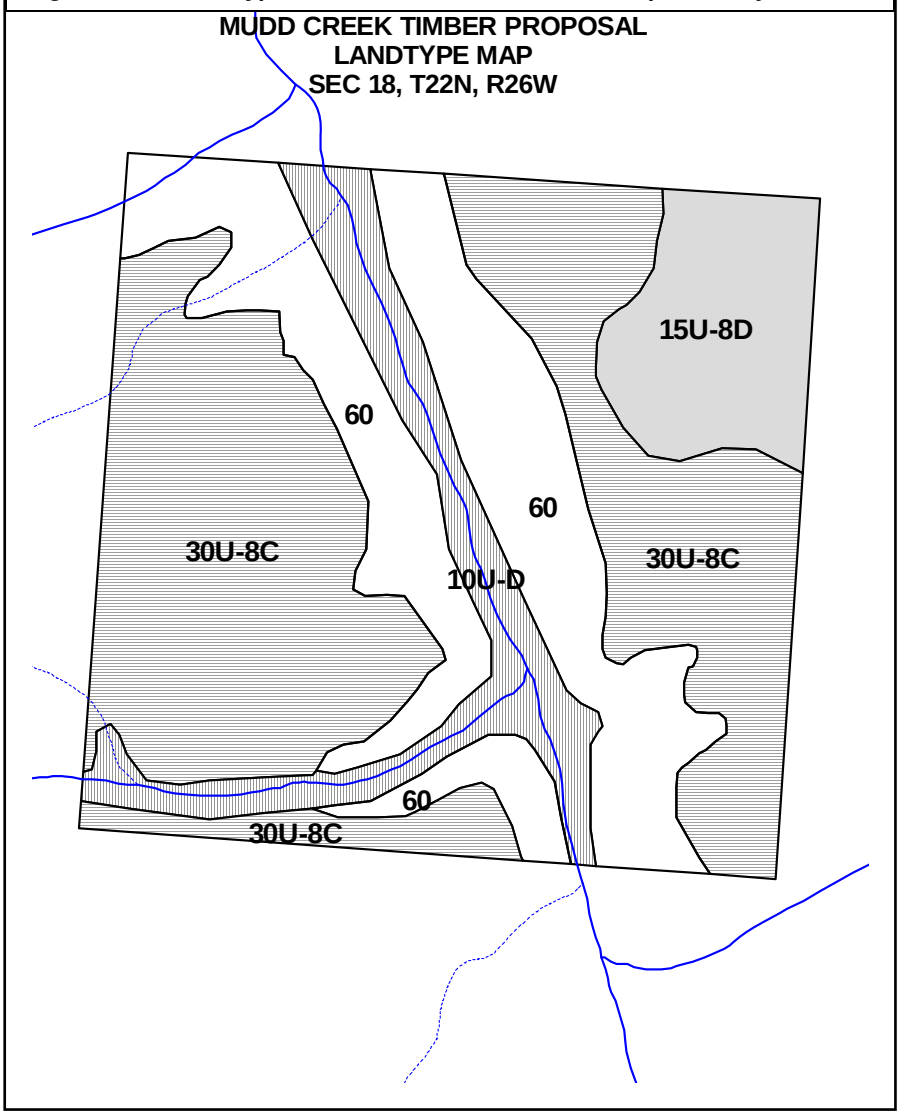
Cumulative Effects

DNRC strives to maintain soil productivity by limiting cumulative soil impacts to 15% or less of a harvest area as noted in the State Forest Management Plan (DNRC, 1996). As a recommended goal, if existing detrimental soil effects exceed 15% of an area, proposed harvest should minimize any additional impacts. Harvest proposals on areas with existing soil impacts in excess of 20% should avoid any additional impacts and include restoration treatments as feasible base on site-specific evaluation and plans. Past monitoring on DNRC timber sales from 1988 to 2003 has shown an average of 13.9% soil impacts across all parent materials. Stratifying the results by parent materials similar to the Mudd Creek parcel, shows an average of approximately 12.2% of the harvest areas impacted (DNRC, 2004).

Cumulative effects from past and current uses on these parcels are limited to skid trails, roads and off-road trails from vehicles. Past harvest operations in the Mudd Creek parcel includes several Christmas tree harvests during the 1946-1963 era; large scale sawlog harvest from 1945 through 1953 and 1963; and, a few smaller timber permits (<100 mbf) since 1963. In addition, firewood gathering has occurred throughout the last 70 years.

While some of these skid trails and roads are still discernable, vegetation similar to the surrounding vegetation is generally present and growing. Through the freeze-thaw cycles and root mass penetrating the soil, impacts from past entries (1940's through 1960's) are substantially reduced. For this reason, DNRC has estimated the area of the cumulative impact to cover less than 10% of the analysis area.

Figure SF-1: Landtypes in the Mudd Creek Timber Proposal Project Area.



ENVIRONMENTAL EFFECTS

Description of Alternatives

No Action Alternative

No timber harvest or associated activities would occur under this alternative.

Action Alternative

Six units totaling approximately 549 would be commercially harvested under the Action Alternative. Approximately 359 acres would be harvested using conventional ground-based equipment while the remaining 190 acres would be treated using cable methods. In addition, approximately 6.2 miles of new road would be constructed, 0.5 miles of road would be reconstructed and approximately 7 miles of road would be maintained or have minor drainage improvements installed as necessary to meet BMPs. Included in this would be the removal of one crossing on Todd Creek and the replacement of one undersized crossing on Mudd Creek. Harvest may be completed under summer or winter conditions.

Direct and Indirect Effects

No Action Alternative

No timber harvest or associated activities would occur under this alternative. Skid trails from past harvesting would continue to recover from compaction as freeze-thaw cycles continue and vegetation root mass increases.

Action Alternative

To provide an adequate analysis of potential impacts to soils, a brief description of implementation requirements is necessary. The Administrative Rules of Montana 36.11.422 (2) and (2)(a) state that appropriate BMPs shall be determined during project design and incorporated into implementation. To ensure the incorporated BMPs are implemented, the specific requirements would be incorporated into the DNRC Timber Sale Contract. As part of this alternative design, the following BMPs are considered appropriate and, therefore would be implemented during harvest operations:

1) Limit equipment operations to periods when soils are relatively dry, (less than 20%), frozen or snow covered to minimize soil compaction and rutting, and maintain drainage features. Check soil moisture conditions prior to equipment start-up.

2) On ground skidding units, the logger and sale administrator will agree to a general skidding plan prior to equipment operations. Skid trail planning would identify which main trails to use, and what additional trails are needed. Trails that do not comply with BMPs (i.e. draw bottom trails) would not be used and may be closed with additional drainage installed where needed or grass seeded to stabilize the site and control erosion.

3) Tractor skidding should be limited to slopes less than 40% unless the operation can be completed without causing excessive erosion. Short steep slopes above incised draws may require a combination of mitigation measures based on site review, such as adverse skidding to ridge or winch line skidding from more moderate slopes less than 40%.

4) Keep skid trails to 20% or less of the harvest unit acreage. Provide for drainage in skid trails and roads concurrent with operations.

5) Slash Disposal- Limit disturbance and scarification combined to 30-40% of harvest units. No dozer piling on slopes over 35%; no excavator piling on slopes over 40% unless the operation can be completed without causing excessive erosion. Consider lop and scatter or jackpot burning on steeper slopes. Accept disturbance incurred during skidding operations to provide adequate scarification for regeneration.

6) Retain 10 to 15 tons large woody debris and a majority of all fine litter feasible following harvest. On commercial thin units where whole tree harvesting is used implement one of the following mitigations for nutrient cycling; 1) use in woods processing equipment that leaves slash on site, 2) for whole tree harvest, return skid slash and evenly distribute within the harvest area, or 3) cut off tops from every third bundle of logs so that tops are dispersed as skidding progresses.

Considering data from the DNRC Soil Monitoring Report (DNRC, 2004), the implementation of Forestry Best Management Practices has resulted in less risk of detrimental soil impacts from erosion, displacement and severe compaction. While the report noted that the impacts were more likely on the fine textured soils and steep slopes, reduced soil productivity due to compaction and displacement may occur on coarser parent materials similar to those found in the state parcels. Also, the greatest impacts were noted where harvest implementation departed from BMPs such as limiting ground-based skidding to slopes of 40 percent or less.

Comparing the soil type map, field reconnaissance notes and topographic map features with the proposed harvest unit map indicates that under this alternative ground-based skidding would occur on slopes of up to 40%, on well-drained relatively rocky soils. The extent of impacts expected would likely be similar to those reported by Collins (DNRC, 2004), or approximately 12-14% of the harvest area. Potential impacts to soils from the cable yarding units would be less than 10% of the area. This level of impact assumes corridor spacing of at least 75 feet, and impacts generally confined to a 6-8 feet width. Potential impacts to soils from cable yarding would generally be displacement although some compaction could occur. In addition, cable corridors pose a slight risk of routing water because the corridor is generally parallel to the fall-line of the hillslope. Table ST-2 summarizes the expected impacts to soils within harvest units.

Table ST-2: Expected acres of impact to soil from compaction and displacement

Harvest Method and Season	No Action Alternative	Action Alternative
Ground Based (12-14% of harvest area)	0	43-50 acres
Cable (10% of harvest area)	0	19.0 acres
Total Area of Impacts (acres)	0	62-69
Total Harvest Acres	0	549
Percent Area Impacted	0	11.3%-12.6%

In addition to the potential impacts from harvesting, approximately 15-18 acres would be taken out of production and converted to roads. Road construction would likely result in more erosion than native topography; however BMP implementation would minimize the risk of erosion. Because no stream crossings are proposed, the risk of delivering soil to watercourses would be very low.

As vegetation begins to establish on the impacted areas, and freeze-thaw cycles occur, the area of reduced productivity would decrease.

Cumulative Soil Effects

Cumulative effects would be controlled by limiting the area of adverse soil impacts to less than 15% of harvest units (as recommended by the SFLMP) through implementation of BMPs, skid trail planning on tractor units and limiting operations to dry or frozen conditions. Future harvest opportunities would likely use the same road system, skid trails and landing sites to reduce additional cumulative impacts. Large woody debris would be retained for nutrient cycling long-term soil productivity.

Some of the area proposed for harvest under this alternative have been harvested in the past using ground based harvest methods. In order to limit cumulative impacts, existing skid trails would be used if they are properly located and adequately spaced. By reusing existing skid trails and mitigating the direct and indirect effects with soils moisture restrictions, season of use and method of harvest, the risk of unacceptable long-term impacts to soil productivity would be low.

REFERENCES:

DNRC, 2004. DNRC Compiled Soils Monitoring Report on Timber Harvest Projects. Missoula, MT.

DNRC, 1996. State Forest Land Management Plan. Montana Department of Natural Resources and Conservation. Missoula, MT.

Collins, Jeff and Ottersberg, R. 1985. Plains Unit Soil Survey. Montana Department of State Lands. Missoula, MT.

Wildlife Analysis

The following issues were expressed as a result of public scoping and internal comments regarding the effects of the proposed timber harvest:

- The project could result in reduced security for wolves, resulting in increased risk of mortality to wolves.
- The project area provides winter range habitat for elk and white-tailed deer. Changes on winter range could result in decreased prey availability for wolves.
- Timber harvesting could enhance flammulated owl habitat by reducing canopy cover, but could impact habitat quality by reducing snag density.
- Timber harvesting could reduce canopy cover and structure needed for pileated woodpecker habitat.
- Timber harvesting and road building could reduce security for big game species. During the hunting season, individual animals could be made more vulnerable to mortality by increasing hunter access and reducing visual obstructions that allow hunters to see an animal at a distance.
- Timber harvesting could reduce thermal cover needed to provide snow intercep*t* and ameliorate the effects of weather, thereby reducing the areas availability to support the current number of big game animals through the winter*.*

The following sections disclose the anticipated direct, indirect and cumulative effects to the wildlife resources in the analysis area from the proposed actions. Past, current, and future planned activities on all ownerships within each analysis area have been taken into account for the cumulative effects analysis.

Analysis Area

For each species, an analysis area that includes the project area and the adjoining 8 sections was selected. For big game winter range analysis, a subset of these lands within winter range was considered. In all cases, the size of this area would provide adequate area to support the species in questions, except the gray wolf (refer to the Gray Wolf section for discussion on analysis area). For each species, an existing condition for the analysis area is defined. The direct and indirect effects analysis describes the habitat components that would be altered, while the cumulative effects analysis consider how those changes fit into the past, concurrent, and future actions (accounted for in the existing condition) within the analysis area. No other foreseeable future actions are proposed within the analysis area.

Coarse Filter Analysis

Of the 108 mammal species known for the state, 68 are suspected or known to occur in Sanders County (Foresman 2001). The majority of terrestrial vertebrates that were present at the time of European settlement likely still occur in the vicinity of the proposed project area. Terrestrial species that rely on special habitat elements, such as white bark pine (*Pinus albicaulis*), western white pine (*Pinus monticola*), or burned areas, may not be present or occur in lower abundance due to the decline of these elements across the landscape. Over time, due to fire suppression, tree densities have increased and shade-

tolerant species, such as Douglas-fir and subalpine fir have become more prevalent than they were historically. These departures probably benefit wildlife species that rely on shade tolerant tree species and /or closed canopy habitats, while negatively affecting species that rely on shade intolerant tree species and/or open habitats.

Direct, Indirect, and Cumulative of the Action Alternative: Under this alternative, no harvests would occur, thus conversion to denser timber stands with higher densities of shade-tolerant species would continue. Forest connectivity would unchanged through the project area would continue to increase in regenerating stands primarily outside the project area. In the cumulative effects analysis area, species that favor denser, connected forests would benefit at the expense of species that use more open stands.

Direct, Indirect, and Cumulative of the Action Alternative: Under this alternative, the proposed harvests would remove mostly shade-tolerant trees and salvage dead and dying trees, thereby reducing overall stand densities. The post harvests stands would consist of scattered shade-intolerant, overstory trees along with snag and coarse woody debris structure. These conditions approximate those that would be expected if natural disturbances continued to occur in the project area. Therefore, these treatments are expected to increase habitat conditions that were historically present in the project area. The reduction in snags would be cumulative to snag reductions in regenerating areas outside the project area. The combination of these harvests and public firewood cutting likely reduces the densities of snags and coarse woody debris in the analysis area. However, retention of snags and cull material in the harvest unit and the unharvested stands are expected to provide some level of habitat structure. Therefore, overall the cumulative effects are expected to be slightly positive by increasing stand structures similar to those expected historically in the analysis area.

Fine Filter Analysis

Table 1 describes which threatened, endangered, sensitive, or big game species were included in this analysis. Following the table, the issues of concern are listed with an analysis of the effects for each species. The direct and indirect effects analysis describes the habitat components that would be altered, while the cumulative effects analysis consider how those changes fit into the past actions of the cumulative effects analysis area.

TABLE 1 - STATUS OF DNRC SENSITIVE SPECIES FOR NWLO IN RELATION TO THIS PROJECT

STATUS	*SPECIES*	DETERMINATION - BASIS
Endangered Species	Gray wolf	***Included –*** The 2002 Fishtrap Pack home range included the project area. Following 2002, this pack moved north away from the project area. From 2002-2005, the project fell outside the Lonepine Pack home range. Dispersal or home range expansion could incorporate the project area.

Threatened Species	Bald eagle	No further analysis conducted – No suitable breeding habitat occurs within the project area. The nearest breeding territory is approximately 10 miles to the southwest, along the Clark Fork River.
	Canada lynx	No further analysis conducted – Dry habitat types that are not consistent with lynx habitat
	Grizzly bear	No further analysis conducted **–** Outside the CYE by about 13 miles. Not considered occupied habitat.
Sensitive species	Black-backed woodpecker	No further analysis conducted – No burned habitat occurs in the project area.
	Coeur d'Alene salamander	No further analysis conducted – No moist talus or streamside talus habitat occurs in the project area.
	Columbian sharp-tailed grouse	No further analysis conducted – No suitable grassland communities occur in the project area.
	Common loon	No further analysis conducted – No lakes occur in or near the project area.
	Fisher	No further analysis conducted – The upland habitats in the project area are drier than those expected to provide fisher habitat, while the riparian habitats appear to provide fisher habitat. These riparian areas range from 200-300+ feet wide and are not proposed to be harvested. No potential fisher habitat would be altered under either alternative and connectivity would be retained.
	Flammulated owl	***Included*** – Dry ponderosa pine habitats occur in the project area.
	Harlequin duck	No further analysis conducted – No suitable streams occur in the project area.
	Northern bog lemming	No further analysis conducted – No sphagnum bogs or other fen/moss mats occur in the area.
	Peregrine Falcon	No further analysis conducted – No potential habitat is expected in the project area.
	Pileated woodpecker	***Included*** – Western larch/Douglas-fir and Ponderosa Pine habitats occur in the area.
	Townsend's big-eared bat	No further analysis conducted – No caves or mine tunnels occur in the project area.
Big Game Species	Elk	Included – ***Year-round use***
	Moose	Included - ***Year-round use***
	Mule Deer	***Included –*** Non-winter use
	White-tailed Deer	***Included –*** Year-round use

Gray Wolf

The project area was incorporated in to the Fishtrap Pack's home range in 2002 (USFWS et al. 2003). Since then, no documented wolf home ranges include the project area (USFWS et al. 2004, USFWS et al. 2005, USFWS et al. 2006). However, wolf activity in the project is likely and this area may be re-colonized in the near future. In 2006, an unconfirmed wolf observation was reported in the project area.

Issue: The project could result in reduced security for wolves, resulting in increased risk of mortality to wolves.

Wolf security is measured by road access, visual screening, and hiding cover. Presently, unrestricted motorized access occurs generally in the valley bottom along Mudd and Todd Creeks. The analysis area includes approximately 55.3 miles of roads, with 27.1 miles (49%) of these roads unrestricted. The simple open road density in the analysis area is approximately 3.0 miles of unrestricted road per square mile. Because this area is heavily roaded, wolf security is low.

Effects of the No Action Alternative: Under this alternative, location of roads that allow motorized public access and the existing vegetation would remain unchanged, resulting in no change in wolf security or risk of mortality.

Effects of the Action Alternative: Under this alternative, motorized public access would remain unchanged. Vegetation strips would be retained along open roads and pockets of regenerating trees and unharvested trees would be retained within all harvest units to breakup sight-distances. Contract stipulations would prohibit contractors from carrying firearms while on duty and require the contractor to prevent public access on restricted roads along haul routes during periods of inactivity (nights, weekends, shutdown periods, etc.). In the case a den or rendezvous site were discovered, contract stipulations would require that the operator cease operations until adequate measures to protect the site were in place. These measures are expected to minimize the effects the project would have on wolves by limiting sight-distances and not increasing motorized access, which combine to mitigate the risk of wolf mortality to a negligible level. However, during harvest activities, some foraging habitat could be avoided due to the disturbance and human presence associated with the project, resulting in negligible effects to wolves. No other activities are expected in the area that would be cumulative to these effects.

Cumulative Effects Common to All Alternatives: The current road management would continue to provide human access to the area and is not expected to change in the foreseeable future. Additionally, no other activities are expected to reduce hiding cover or visual screening in the analysis area. Therefore, only the changes discussed above are expected to affect wolf security in the analysis area. Cumulatively, the risk of these changes resulting in increased mortality is low under either alternative.

Issue: The project area provides winter range habitat for elk and white-tailed deer. Changes on winter range could result in decreased prey availability for wolves.

Typically, habitat changes are analyzed on a home range scale. However, for this analysis a more localized view was selected. The 2002 Fishtrap Pack home range (284,531 acres) contains 76,263 and 72,478 acres of elk and white-tailed deer winter range, respectively. Since this home range size is quite large and would drowned out any effects produced on 640 acres, a more localized area defined by the project area and the adjacent sections was used to assess affects. The 5,811-acre analysis area is comprised of Plum Creek Timber Company (64.0%), DNRC (25.1%), and US Forest Service (10.9%) managed lands with 3,090 acres and 1,881 acres of white-tailed deer and elk winter range, respectively.

Direct, Indirect, and Cumulative Effects of the No Action Alternative: No changes are expected on big game winter range within the project area or on adjacent lands. In time, harvested stands would continue to grow to provide thermal cover in the near future. The increase in the amount of thermal cover is expected to benefit wintering big game species, resulting in increased prey availability through time, until foraging habitat becomes limiting.

Effects of the Action Alternative: Canopy cover would be reduced on the 269 acres (8.7%) of winter range found within the project area. During heavy snow accumulations, the harvest units might be avoided in favor of denser canopy that intercepts snow. Therefore, wolf use of the area would likely follow changes in big game use during the winter. These changes would likely result in habitat shifts, but not in a change in prey availability.

Cumulative Effects of the Action Alternative: The proposed harvests would combine with past timber harvests to reduce thermal cover on this portion of the winter range to 51.6% of the analysis area. However, numerous adjacent stands appear to be regenerating to a point where they could provide thermal cover in the near future. Therefore, the reduction of thermal cover produced by this alternative is expected to result in a low risk of reducing prey availability in the analysis area because adequate amounts of thermal cover would be retained on the winter range post harvest and the reduction of thermal cover is expected to be short duration due to retention of 30-40% canopy cover of overstory trees and regenerating stands developing into thermal cover on adjacent lands.

SENSITIVE SPECIES

Flammulated Owl

Issue: Timber harvesting could enhance flammulated owl habitat by reducing canopy cover, but could impact habitat quality by reducing snag density.

Flammulated owl habitat consists of stands of large ponderosa pine trees and snags with a relatively open understory. Within these stands, flammulated owls nest in cavities of large snags (primarily ponderosa pine). Nesting sites consist of large snags with dense understory (Bull et al. 1990, Wright et al. 1997). Without disturbance, Douglas-fir encroach ponderosa pine stands increasing understory and stand stocking, resulting in decreased habitat for flammulated owls. These conditions are currently found within the project area. In the surrounding area (adjoining sections), many of the stands have been harvested, which removed the large tree structure needed by flammulated owls. Therefore, the amount of habitat for flammulated owls in the analysis area is low.

Direct, Indirect, and Cumulative Effects of the No Action Alternative: Under this alternative the flammulated owl habitat quality would remain poor due to retention of the heavily Douglas-fir encroached ponderosa pine stands. Additionally, if fire were introduced in the stand, the Douglas-fir could provide ladder fuel to facilitate movement of fire from the ground to the tree canopy, resulting in high mortality rates of overstory trees. In this case, flammulated owl habitat would be lost for a long period of time. This alternative is expected to result in continued low habitat quality for flammulated owls.

Direct and Indirect Effects of the Action Alternative: Under this alternative the harvest would focus on removing the encroaching Douglas-fir, while retaining most of the large diameter ponderosa pine, western larch, and Douglas-fir. In addition to the leave trees, at least 1 snag and 1 snag recruitment tree per acre would be retained in each harvest unit. The distribution of retention snags/recruitment trees could be localized or dispersed throughout the harvest units. Cull snags and trees are likely to be left on site to provide additional forest structure, where they do not provide safety concerns or inhibit silvicultural goals. Snag retention is expected to be higher in the tractor harvest units (Units 1, 4, 6) than in the cable harvest units (Units 2, 3, 5) due to safety concerns and logging logistics. However, a minimum of 1 snag/acre and pockets of regenerating trees would be retained in all units. If these pockets occur near snags, nesting habitat could be enhanced.

Cumulative effects of the Action Alternative: Cumulatively, the proposed prescriptions are expected to improve habitat conditions on 531 acres. Improved habitat conditions within the project area would increase available habitat within the analysis area, thereby benefiting flammulated owls. Therefore, this alternative is expected to result in minor beneficial cumulative effect to flammulated owl habitat within the analysis area.

Pileated Woodpecker

Issue: Timber harvesting would reduce canopy cover and structure needed for pileated woodpecker habitat.

DNRC defines pileated woodpecker habitat as “live mature cottonwood stands and mature conifer forest with overstory canopies dominated by large-sized western larch or ponderosa pine, and containing Douglas-fir, large snags, and coarse woody debris” (ARM 36.11.403[58]). Based on this definition, DNRC lands within the analysis area support 1,111 acres of pileated woodpecker habitat of which 531 acres occur in the project area. Aerial photographical interpretation identified an additional 676 acres of potential habitat on adjacent lands within the analysis area. The 5,881-acre analysis area contains an estimated 1,787 acres (30.4%) of pileated woodpecker habitat. Timber harvests on much of the PCTC managed lands appear to have removed the canopy cover and structure required by pileated woodpeckers, while habitat still may be available USFS lands.

Direct, Indirect and Cumulative Effects of the No Action Alternative: Under this alternative the amount and quality of pileated woodpecker habitat would remain unchanged in the project area in the short-term. In the longer term, the mature stands are likely to continue to convert to stands dominated by shade-tolerant tree species, while regenerating stands could age to the point that nesting snags/trees develop. In both cases, pileated woodpecker habitat is expected to increase.

Direct and Indirect Effects of the Action Alternative: Under this alternative timber harvesting would reduce canopy cover on 531 acres of pileated woodpecker habitat, while retaining at a minimum, the estimated historic densities of snags (Harris 1999) and large preferred tree species (PP, WL, DF). Therefore, pileated woodpecker habitat quality could be reduced in the short-term, but the structure and preferred tree species used by pileated woodpeckers would be retained. Pileated woodpeckers could continue to use the area in the short-term to some degree, with use increasing as the retained tree canopy closes in the near future (10-20 years).

Cumulative Effects of the Action Alternative: In the analysis area, pileated woodpecker habitat would be reduced from 30.4% to 21.4% of the analysis area. This reduction would be cumulative to previous harvests on adjacent lands that removed pileated woodpecker habitat. However, the structure needed for pileated woodpeckers would be retained to some degree, thereby potentially allowing the harvest units to retain some pileated woodpecker use and/or reducing the duration of habitat loss. Cumulatively, pileated woodpecker habitat is expected to decrease, but due to retention of 20-40% of the overstory tree canopy cover and snag structure, the decrease is expected to be short duration. In the long-term, regenerating stands on adjacent lands could develop into pileated woodpecker habitat.

BIG GAME SPECIES

The project area provides habitat for primarily white-tailed deer and elk. Mule deer and moose could move through the project area, but are not expected to use the area heavily. Additionally, issues related to security for these species are consistent with the issues raised for white-tailed deer and elk. Therefore, the big game analysis will focus only on white-tailed deer and elk.

Issue: Timber harvesting and road building could reduce security for big game species. During the hunting season, individual animals could be made more vulnerable to mortality by increasing hunter access and reducing visual obstructions that allow hunters to see an animal at a distance.

The project area is located in Hunting District 122. Elk, mule deer, and white-tailed deer species are hunted during a 5-week general hunting season. Currently, open roads allow motorized access on both sides of Mudd Creek and south of Todd Creek. Restricted roads allow non-motorized access north of Todd Creek and into the northwest corner of the project area during the hunting season. No roads occur in the rest of the project area. The vegetation along these roads and within the harvest units provides visual obstructions that limit site distances through the stands. The limited site distances reduce the chance of an animal being detected and killed during the hunting season.

Direct, Indirect, and Cumulative Effects of the No Action Alternative: Under this alternative no changes to big game security would occur. No thermal cover would be removed. Overtime, thermal cover would increase as previous harvested stands regenerate, thereby benefiting big game species.

Direct, Indirect, and Cumulative Effects of the Action Alternative: Under this alternative the vegetation would be removed and additional roads would be constructed, which could decrease big game security. Removal of timber could increase sight distances, resulting in an increase in the distance a hunter can see and shoot an animal.

As part of the project design, visual screening would be retained along open roads. Visual screening along open roads decreases vulnerability by reducing the distance that a hunter can detect or kill an animal. Additionally, pockets of regenerating trees and shrubs would be retained within each harvest unit along with tree boles of retention trees to reduce sight distances in the harvest units. Therefore, this alternative would increase sight distance resulting in decreased security for big game; however, mitigations are in place to limit the site distances while reaching the project objectives. This project would build approximately 6.2 miles of roads. The new roads would only be used for timber harvest and would be restricted to the public during and following harvest. These roads would increase the ease of non-motorized access into the project area, but would not change legal motorized use or access points. A potential for illegal motorized access along these roads could occur, however, it appears that the current road closures are effective. Taken together, the proposed project is likely to decrease big game security, but with retention of visual screening along open roads, visual obstructions throughout the harvest units, along with no increases in motorized roaded access, the change in security is expected to result in negligible increases in mortalities to big game during the hunting season. Therefore, the risk of increased mortality to big game species using the analysis are is low.

Issue: Timber harvesting could reduce thermal cover needed to provide snow intercept and ameliorate the effects of weather.

The analysis area includes designated white-tailed deer winter range within mixed ownership of 1,098 acres of DNRC and 1,993 acres of PCTC. On DNRC lands, thermal cover is provided on 834 (76.0%) acres. Aerial photography interpretation indicates that an additional 1,031 (51.7%) acres are available on adjoining PCTC lands. Overall, 60.3% of the winter range in the analysis area provides thermal cover. Many of the stands on PCTC lands that are not currently providing thermal cover are regenerating and could start to provide this habitat component in 10-30 years.

Direct, Indirect, and Cumulative of the No Action Alternative: Under this alternative, no thermal cover would be removed. No changes within the project area are expected, however, in the near future, the amount of thermal in the analysis area is expected to increase due to regenerating stands on PCTC lands. Overall, the increase in thermal cover is expected to benefit big game species wintering in the analysis area.

Direct, Indirect, and Cumulative of the Action Alternative: Approximately 269 acres of thermal cover on DNRC lands would be harvested. The harvests prescription in Unit 1 and Unit 2 would remove thermal cover, but average canopy cover within these units would be retained above 30% and 40%, respectively. Thereby, the overstory retention could continue to provide some thermal cover in the short-term and the retained canopy is expected to expand and close to reduce the amount of time needed for thermal cover to recover. Additionally, pockets of thick overhead cover (regenerating and retention trees) would be retained scattered throughout the harvest units. The proposed harvest would reduce thermal cover on DNRC lands from 834 (76.0% of DNRC lands) to 565 acres (51.5% of DNRC lands). Following harvest, 51.7% of the analysis area would provide thermal cover. This reduction is not expected to impact the carrying capacity for elk because elk are tolerant of more open winter range. Conversely, white-tailed deer rely on thermal cover to provide snow intercept, which provides more access to forage and lowers the energetic costs of movement. The reduction of 269 acres of thermal cover could reduce habitat availability of thermal cover slightly, resulting in habitat shifts away from the harvest units during periods of heavy snow accumulations. Unit 2 (100 acres) occurs on a steep southwest slope that remains bare throughout most winters. Since

snow depths in this unit tend to be low, the reduction in canopy cover is not expected to result in deep snow accumulations that would cause big game species to avoid the area or expend additional energy to survive. However, reductions in canopy cover in Unit 1 are expected to result in avoidance of the area during periods of heavy snow accumulations. Due to the large size of the winter range, reductions of thermal cover in Unit 1 would likely result in insignificant changes to carrying capacity of white-tailed deer. Therefore, there would likely be an overall low risk of reducing the carrying capacity of big game species in the analysis area.

LITERATURE CITED

Bull, EL, AL Wright, and MG Henjum. 1990. Nesting habitat of flammulated owls in Oregon. J. raptor res. 24(3): 52-55.

Harris, RD. 1999. Abundance and characteristics of snags in western Montana forests. USDA For. Serv.Gen. Tech. Rep. RMRS-GTR-31. Rocky Mtn. Res. Sta., Ogden, UT. 19p.

U.S. Fish and Wildlife Service, Nez Perce Tribe, National Park Service, and USDA

Wildlife Services. 2003. Rocky Mountain Wolf Recovery 2002 Annual Report. T. Meier, ed. USFWS, Ecological Services, 100 N Park, Suite 320, Helena MT. 64 pp.

U.S. Fish and Wildlife Service, Nez Perce Tribe, National Park Service, and USDA Wildlife Services. 2004. Rocky Mountain Wolf Recovery 2003 Annual Report. T. Meier, ed. USFWS, Ecological Services, 100 N Park, Suite 320, Helena MT. 65 pp.

U.S. Fish and Wildlife Service, Nez Perce Tribe, National Park Service, Montana Fish, Wildlife and Parks, Idaho Fish and Game, and USDA Wildlife Services. 2005. Rocky Mountain Wolf Recovery 2004 Annual Report. D. Boyd, ed. USFWS, Ecological Services, 100 N Park, Suite 320, Helena MT. 72 pp.

U.S. Fish and Wildlife Service, Nez Perce Tribe, National Park Service, Montana Fish, Wildlife & Parks, Idaho Fish and Game, and USDA Wildlife Services. 2006. Rocky Mountain Wolf Recovery 2005 Annual Report. C.A. Sime and E. E. Bangs, eds. USFWS, Ecological Services, 585 Shepard Way, Helena, Montana. 59601. 130pp.

Wright, V, SJ Hejl, and RD Hutto. 1997. Conservation implications of a multi-scale study of flammulated owl (Otus flammeolus) habitat use in the northern Rocky Mountains, USA. Pages 506-516 *in* Duncan, JR, DH Johnson, and TH Nicolls, eds. Biology and conservation of owls of the Northern Hemisphere, Second international symposium. USDA For. Serv. Gen. Tech. Rep. NC-190.

Olsen, Dave

From: Rennie, Patrick
Sent: Thursday, September 29, 2005 11:47 AM
To: Olsen, Dave
Subject: Mud Creek Timber Sale

Dave:

The attached language should suffice for the cultural resource section of the EA:

In September of 2005 the DNRC staff archaeologist reviewed the project area. No cultural resources have been identified in the area of potential effect and no heritage properties should be effected with proposed timber sale developments.

Let me know if you need additional information.

Patrick Rennie
DNRC Archaeologist

9/29/2005

Attachment 3

Prescriptions

Proposed Mudd Creek Timber Sale Harvest Unit Prescriptions

Harvest Unit: 1 (see Map, p.13) **Harvest Unit Acres:** 190 acres

Elevation: 3700-3900' **Slope:** 5-35 % **Aspect:** Flat to Northeasterly

Habitat Type: ABGR/XETE, PSME/CARU, PSME/PIPO, PSME/AGSP

Current Cover Type: ponderosa pine

Potential Vegetation Class: ponderosa pine

Soil Type: Loneman silt loam, Courville gravelly silt loam, Winfall gravelly silt loam, Mitten gravelly silt loam, Tevis gravelly silt loam, Repp gravelly silt loam

Description of Existing Stand: This unit is located to the east of road 18-1 and is comprises stands in the east half of the northeast quarter and the east half of the south east quarter of Section 18, Township 22 North, Range 26 West. The unit is comprised of four identified stands in the Stand Level Inventory. The topography is mostly flat with slopes ranging from 0-35 %. Douglas-fir is the dominant species in the overstory (70%), with patches of ponderosa pine (20%) and isolated western larch (10%). Overstory tree height averages 85 feet and ranges from 70 to 100 feet. The overstory ranges from 12-22" DBH and averages 17" DBH with a few scattered +25" DBH. The age of the stand ranges from 90 to 210 years and averages 140 years old with scattered older (+250 years) ponderosa pine and Douglas-fir remain as remnants of pre-1910 stand. Overstory trees are evenly distributed and form a relatively closed canopy layer. Regeneration is limited to scattered groupings of Douglas-fir and grand fir. The Douglas-fir beetle (*Dendroctunus pseudotsugae*) is active and found in patches of Douglas-fir. There is an intermediate component of Douglas-fir (80%) and patches of healthy western larch (10%) and ponderosa pine range from 8-12" DBH averaging 10" DBH and average 56 feet. There is a minor component of grand fir in the intermediate story; however most show evidence of the Fir Engraver beetle (*Scolytus ventralis)* and Indian paint fungus (*Echinodontium tinctorium)*. Surface fuel loading of down material ranges from 15-20 tons per acre.

Treatment Objectives:

- Remove unhealthy trees, as well as those with poor vigor, from the overstory to promote long-term forest health.
- Thin intermediate and understory components of stand to enhance growth characteristics and reduce fuel loading.
- Promote natural ponderosa pine and western larch regeneration in areas where Douglas-fir is becoming dominant component in the stand.

Prescribed Treatment:

- Selective thinning, spacing out healthy trees with good crown and bark characteristics on a variable spacing of 40-45 feet (leaving 20-30 TPA). Favor leaving ponderosa pine and western larch, then Douglas-fir in that order. Remove all merchantable lodgepole and grand fir.
- Reduce 80% canopy cover to 30-35% canopy cover.
- Create openings of 150' on at least two sides of existing clumps or isolated individual ponderosa pine and western larch overstory trees in the areas where Douglas –fir is the predominant species.
- Retain at least two snags per acres >14" DBH and two snag recruits per acre to remain standing if they are not a safety hazard.

Harvest Method:

- Tractor logging with conventional, mechanical, or cut-to-length operations are applicable to this unit.
- Trees marked to cut.

Hazard Reduction:

- Pile and burn at landings following harvest.
- Slash would be lopped and /or trampled to a depth of 18" or less. In openings where ponderosa pine regeneration is a primary goal, slash would be spot piled and burned.
- Excavator pile and burn all slash in excess of retention requirements of 5 to 10 tons per acre on areas accessible to excavator.

Regeneration/Site Preparation:

- Precommercial thin healthy regeneration to promote future growth and vigor.
- In openings where ponderosa pine and western larch regeneration is a primary goal, 30% of ground would be scarified during excavator piling and burned.
- Monitor success of natural regeneration and plant seedlings if necessary.

Anticipated Future Treatments:

- Stand conditions would be monitored for future salvage opportunities related to insect and disease outbreaks, severe weather events, fire or other unanticipated circumstances on a case-by-case basis.
- This stand would be evaluated for regeneration and possible precommercial thinning opportunities as the stand progresses in age.

Harvest Unit: 2 (see Map, p.13) **Harvest Unit Acres:** 100

Elevation: 3300-3800' **Slope:** 35-60 % **Aspect:** West to southwest

Habitat Type: PSME/AGSP, PSME/SYAL, PSME/CARU, PSME/PIPO

Current Cover Types: ponderosa pine and Douglas-fir

Potential Vegetation Class: ponderosa pine and Douglas-fir

Soil Type: Repp gravelly silt loam, Mitten gravelly silt loam, Winfall gravelly silt loam

Description of Existing Stand: Stand is located east of the county road and west of road 18-1 is Section 18, Township 22 North, Range 26 West. The unit is comprised of five identified stands in the Stand Level Inventory. The topography is moderately steep with slopes ranging from 35-60 %. The upper 1/3 of the unit contains multiple natural openings which are dominated by a grass-shrub community of pinegrass, Idaho fescue, arrowleaf balsamroot, antelope bitterbrush, Lupine and western yarrow which are indicative of xeric sites and slow natural regeneration. These openings contain a few ponderosa pine and scattered overmature, decadent Douglas-fir estimated at over 250 years old. The lower two-thirds of the stand is a multi-storied structure composed of mostly Douglas-fir (65%) and ponderosa pine (20%). Overstory age averages 135 years ranging from 100 to 150 years. Trees over 200 years old are present in a minor amount, averaging three per acre. The overstory DBH averages 16" DBH, ranging from 11-22" DBH with a few, scattered +25" DBH. Overstory height averages 71 feet, ranging from 65-95 feet. There is a strong intermediate component of consisting mainly Douglas –fir (80%) and ponderosa pine (20%). The intermediate component averages 10" DBH, ranging from 7-12" DBH and averages 48 feet in height. There is evidence of mistletoe, root rot and Douglas-fir bark beetle (*Dendroctunus pseudotsugae*) populations in both all levels of the stand causing some mortality. The third age class consists mostly of Douglas-fir and grand fir. The Douglas-fir regeneration exhibits signs of mistletoe infestation and is generally suppressed. Surface fuel loading of down material ranges from 10-20 tons per acre.

Treatment Objectives:

- Remove unhealthy trees, as well as those with poor vigor, from the over story to promote long-term forest health.
- Thin intermediate and understory components of stand to enhance growth characteristics and reduce fuel loading.
- Promote natural ponderosa pine regeneration in areas where Douglas-fir is becoming dominant component in the stand.

Prescribed Treatment:

- Selective thinning, spacing out healthy trees with good crown and bark characteristics on a variable spacing of 30-35 feet (leaving 35-40 TPA). Favor leaving ponderosa pine and western larch, then Douglas-fir in that order. Remove all merchantable lodgepole and grand fir.

- Create openings of 100’ on at least two sides of existing clumps or isolated individual ponderosa pine overstory trees in the areas where Douglas –fir is the predominant overstory species.
- Reduce 65% canopy cover to 40-45% canopy cover.
- Retain large diameter, decadent Douglas-fir for shading, cover and snag replacement.
- Retain at least two snags per acres >14” DBH and two snag recruits per acre to remain standing if they are not a safety hazard.

Harvest Method:

- Line skidding operations are applicable to this unit.
- Trees marked to cut.

Hazard Reduction:

- Pile and burn at landings following harvest.
- Lop slash in unit to a depth of 18” or less.

Regeneration/Site Preparation:

- Regeneration is not a primary objective for this stand. Treatment would leave stand adequately stocked.
- In areas where openings occur in canopy larger than one acre, inter-planting may occur. These acres would be monitored for natural regeneration three years after harvest completion, and if necessary, seedlings would be ordered.

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Anticipated Future Treatments:

- Stand conditions would be monitored for future salvage opportunities related to insect and disease outbreaks, severe weather events, fire or other unanticipated circumstances on a case-by-case basis.
- This stand would be evaluated for regeneration and possible precommercial thinning opportunities as the stand progresses in age.

Harvest Unit: 3 (see Map, p.13) **Harvest Unit Acres:** 74

Elevation: 3300-3700' **Slope:** 30-55% **Aspect:** East to Northeast

Habitat Type: ABLA/VACA, PSME/CARU, ABGR/XETE, PSME/VACA

Current Cover Type: Western larch/Douglas-fir, ponderosa pine

Potential Vegetation Class: Western larch/Douglas-fir, ponderosa pine

Soil Type: Courville gravelly silt loam, Mitten gravelly silt loam, Winkler gravelly silt loam, Tevis gravelly silt loam

Description of Existing Stand: The stand is located to the west of the county road and Mudd Creek, and east of Road 18-4 in Section 18, Township 22 North, Range 26 West. The unit is comprised of six identified stand in the Stand Level Inventory. The topography is moderately steep with slopes ranging from 30-55%. The stand is a multi-storied structure composed of mostly Douglas-fir (55%) and ponderosa pine (30%), with a minor component of western larch (15%). Overstory age averages 135 years ranging from 95-200 years old. Trees over 200 years old are present in a minor amount, averaging three per acre. A few healthy, old growth ponderosa pine (250+ years) are found on the south slope above the Todd Creek Road. The overstory DBH averages 16" DBH, ranging from 12-21" DBH with a few, scattered +25" DBH. Overstory height averages 78 feet, ranging from 65-100 feet. Overstory trees are evenly distributed and form a relatively closed canopy layer. There is a strong intermediate component of consisting mainly Douglas –fir (80%) and ponderosa pine (20%). The intermediate component averages 10" DBH, ranging from 5-12" DBH and averages 48 feet in height. There is evidence of Douglas-fir bark beetle (*Dendroctunus pseudotsugae*) populations in both all levels of the stand causing minor mortality. Regeneration is limited to scattered groupings of Douglas-fir and grand fir. The Douglas-fir regeneration exhibits signs of mistletoe infestation and is generally suppressed. Surface fuel loading of down material ranges from 10-20 tons per acre.

Treatment Objectives:

- Remove unhealthy trees, as well as those with poor vigor, from the over story to promote long-term forest health.
- Thin intermediate and understory components of stand to enhance growth characteristics and reduce fuel loading.
- Promote natural ponderosa pine regeneration in areas where Douglas-fir is becoming dominant component in the stand.

Prescribed Treatment:

- Selective thinning, spacing out healthy trees with good crown and bark characteristics on a variable spacing of 40-45 feet (leaving 20-30 TPA). Favor leaving ponderosa pine and western larch, then Douglas-fir in that order. Remove all merchantable lodgepole and grand fir.
- Reduce 75% canopy cover to 30-35% canopy cover.

- Create openings of 150’ on at least two sides of existing clumps or isolated individual ponderosa pine overstory trees in the areas where Douglas –fir is the predominant overstory species.
- Retain at least two snags per acres >14” DBH and two snag recruits per acre to remain standing if they are not a safety hazard.

Harvest Method:

- Line skidding operations are applicable to this unit.
- Trees marked to cut.

Hazard Reduction:

- Pile and burn at landings following harvest.
- Slash would be lopped to a depth of 18” or less. In openings where ponderosa pine regeneration is a primary goal, slash would be spot piled and burned.
- Jackpot burn in areas inaccessible to equipment.

Regeneration/Site Preparation:

- Precommercial thin healthy regeneration to promote future growth and vigor.
- Spatial openings created by the proposed treatments should provide opportunities for establishment of natural regeneration.
- In openings where ponderosa pine regeneration and western larch is a primary goal, 30% of ground would be scarified during excavator piling and burned.
- Monitor success of natural regeneration and plant seedlings if necessary.

Anticipated Future Treatments:

- Stand conditions would be monitored for future salvage opportunities related to insect and disease outbreaks, severe weather events, fire or other unanticipated circumstances on a case-by-case basis.
- This stand would be evaluated for regeneration and possible precommercial thinning opportunities as the stand progresses in age.

Harvest Unit: 4 (see Map, p.13) **Harvest Unit Acres:** 150 acres

Elevation: 3700-3800' **Slope:** 0-35 % **Aspect:** Flat to Easterly

Habitat Type: PSME/CARU, ABGR/XETE, PSME/VACA, PSME/CARU, ABLA/VACA, PICEA/PIPO

Current Cover Type: ponderosa pine, Western larch/Douglas-fir

Potential Vegetation Class: ponderosa pine, Western larch/Douglas-fir

Soil Type: Mitten gravelly silt loam, Winkler gravelly silt loam Tevis gravelly silt loam

Description of Existing Stand: Stand is located west of Road 18-4 in the western half of Section 18, Township 22 North, Range 26 West. The unit is comprised of five identified stands in the Stand Level Inventory. The topography is moderately steep with slopes ranging from 0-35 %. The lower two-thirds of the stand is a multi-storied structure composed of mostly Douglas-fir (65%) and ponderosa pine (20%), with a minor component of western larch (15%). Overstory age averages 135 years ranging from 100 to 150 years. Trees over 200 years old are present in a minor amount, averaging three per acre. The overstory DBH averages 16" DBH, ranging from 11-22" DBH with a few, scattered +25" DBH. Overstory height averages 71 feet, ranging from 65-95 feet. Overstory trees are evenly distributed and form a relatively closed canopy layer. There is a strong intermediate component of consisting mainly Douglas –fir (80%) and ponderosa pine (20%) along with components of grand fir and Engelmann spruce. The intermediate component averages 10" DBH, ranging from 3-12" DBH and averages 48 feet in height. There is evidence of mistletoe, root rot and Douglas-fir bark beetle (*Dendroctunus pseudotsugae*) populations in both all levels of the stand causing some mortality. Regeneration is limited to scattered groupings of Douglas-fir and grand fir. The Douglas-fir regeneration exhibits signs of mistletoe infestation and is generally suppressed. Surface fuel loading of down material ranges from 10-20 tons per acre.

Treatment Objectives:

- Create a regeneration stand of western larch and Douglas-fir.
- Harvest suppressed, diseased and poorly formed intermediate age class trees.
- Harvest all merchantable lodgepole pine and grand fir.
- Promote natural ponderosa pine and western larch regeneration in areas where Douglas-fir is encroaching in ponderosa pine stand.

Prescribed Treatment:

- Seed tree/shelterwood harvest, leaving an average of 25 western larch, Ponderosa pine and Douglas-fir per acre of varying diameters, heights, and age classes (variable spacing).
- Reduce 80% canopy cover to 20% canopy cover.
- Create openings of 150' on at least two sides of existing clumps or isolated individual ponderosa pine overstory trees in the areas where Douglas –fir is the predominant understory species.

- Retain healthy, vigorous ponderosa pine of varying diameters, heights, and age classes (average spacing 45-55').
- Retain at least two snags per acres >14" DBH and two snag recruits per acre to remain standing if they are not a safety hazard.

Harvest Method:

- Tractor Logging with conventional, mechanical, or cut-to-length operations are applicable to this unit.
- Trees marked to leave.

Hazard Reduction:

- Pile and burn at landings following harvest.
- Slash would be lopped and /or trampled to a depth of 18" or less. In openings where ponderosa pine regeneration is a primary goal, slash would be spot piled and burned.
- Excavator pile and burn all slash in excess of retention requirements of 5 to 10 tons per acre on areas accessible to excavator.

Regeneration/Site Preparation:

- Precommercial thin healthy regeneration to promote future growth and vigor.
- In openings where ponderosa pine regeneration is a primary goal, 30% of ground would be scarified during excavator piling and burned.
- Monitor success of natural regeneration and plant seedlings if necessary.

Anticipated Future Treatments:

- Stand conditions would be monitored for future salvage opportunities related to insect and disease outbreaks, severe weather events, fire or other unanticipated circumstances on a case-by-case basis.
- This stand would be evaluated for regeneration and possible precommercial thinning opportunities as the stand progresses in age.

Harvest Unit: 5 (see Map, p.13) **Harvest Unit Acres:** 16

Elevation: 3300-3500' **Slope:** 30-60 % **Aspect:** North to Northeasterly

Habitat Type: ABGR/LIBO, PSME/CARU

Current Cover Type: Western larch/Douglas-fir

Potential Vegetation Class: Western larch/Douglas-fir

Soil Type: Mitten gravelly silt loam

Description of Existing Stand: Stand is located west of Mudd Creek and south of Todd Creek intersection in the southern end of Section 18, Township 22 North, Range 26 West. The unit is comprised of two identified stands in the Stand Level Inventory. The topography is moderately steep with slopes ranging from 30-60 %. Overstory age averages 135 years ranging from 100 to 150 years. Trees over 200 years old are present in a minor amount, averaging three per acre. The overstory DBH averages 16" DBH, ranging from 11-22" DBH with a few, scattered +25" DBH. Overstory height averages 86 feet, ranging from 70-100 feet. The overstory consists mainly of Douglas –fir (65%) and western larch (20%) along with components of grand fir and Engelmann spruce. Overstory trees are evenly distributed and form a closed upper canopy layer. The intermediate component averages 10" DBH, ranging from 6-12" DBH and averages 62 feet in height. There is evidence of mistletoe, root rot and Douglas-fir bark beetle (*Dendroctunus pseudotsugae*) populations in both all levels of the stand causing some mortality. The third age class consists mostly of Douglas-fir and grand fir. The Douglas-fir regeneration exhibits signs of mistletoe infestation and is generally suppressed. Surface fuel loading of down material ranges from 10-20 tons per acre.

Treatment Objectives:

- Remove unhealthy trees, as well as those with poor vigor, from the over story to promote long-term forest health.
- Thin intermediate and understory components of stand to enhance growth characteristics and reduce fuel loading.
- Promote natural western larch regeneration in areas where Douglas-fir is becoming dominant component in the stand.

Prescribed Treatment:

- Selective thinning, spacing out healthy trees with good crown and bark characteristics on a variable spacing of 40-45 feet (leaving 20-30 TPA). Favor leaving ponderosa pine and western larch, then Douglas-fir in that order. Remove all merchantable lodgepole and grand fir.
- Reduce 85% canopy cover to 30-35% canopy cover.
- Create openings of 150' on at least two sides of existing clumps or isolated individual ponderosa pine and western larch overstory trees in the areas where Douglas –fir is the predominant overstory species.
- Retain at least two snags per acres >14" DBH and two snag recruits per acre to remain standing if they are not a safety hazard.

Harvest Method:

- Line skidding operations are applicable to this unit.
- Trees marked to cut.

Hazard Reduction:

- Pile and burn at landings following harvest.
- Slash would be lopped and /or trampled to a depth of 18” or less. In openings where western larch regeneration is a primary goal, slash would be spot piled and burned.
- Excavator pile and burn all slash in excess of retention requirements of 5 to 10 tons per acre on areas accessible to excavator.

Regeneration/Site Preparation:

- Precommercial thin healthy regeneration to promote future growth and vigor.
- In openings where western larch regeneration is a primary goal, 30% of ground would be scarified during excavator piling and burned.
- Monitor success of natural regeneration and plant seedlings if necessary.

Anticipated Future Treatments:

- Stand conditions would be monitored for future salvage opportunities related to insect and disease outbreaks, severe weather events, fire or other unanticipated circumstances on a case-by-case basis.
- This stand would be evaluated for regeneration and possible precommercial thinning opportunities as the stand progresses in age.

Harvest Unit: 6 (see Map, p.13) **Harvest Unit Acres:** 15

Elevation: 3500-3600' **Slope:** 5-35 % **Aspect:** North

Habitat Type: ABGR/LIBO, PSME/CARU

Current Cover Type: Western larch/Douglas-fir

Potential Vegetation Class: Western larch/Douglas-fir

Soil Type: Mitten gravelly silt loam, Courville gravelly silt loam, Tevis gravelly silt loam

Description of Existing Stand: Stand is located west of Mudd Creek and south of Road 18-5 in Section 18, Township 22 North, Range 26 West. The unit is comprised of two identified stands in the Stand Level Inventory. The topography is mostly flat with slopes ranging from 5-35 %. The overstory consists mainly of Douglas-fir (90%) with a few scattered ponderosa pine. Overstory age averages 140 years old ranging from 100 to 150 years. Trees over 200 years old are present in a minor amount, averaging two per acre. The overstory DBH averages 16" DBH, ranging from 12-20" DBH with a few, scattered +25" DBH. Overstory height averages 87 feet, ranging from 70-100 feet. Overstory trees are evenly distributed and form a relatively closed canopy layer. There is a strong intermediate component of consisting mainly Douglas –fir (90%) with a few scattered ponderosa pine which averages 10" DBH, ranging from 6-12" DBH and averages 62 feet in height. There is evidence of mistletoe, root rot and Douglas-fir bark beetle (*Dendroctunus pseudotsugae*) populations in both levels of the stand causing some mortality. Regeneration consists mostly of Douglas fie and grand fir and is generally suppressed. Surface fuel loading of down material ranges from 10-20 tons per acre.

Treatment Objectives:

- Remove unhealthy trees, as well as those with poor vigor, from the over story to promote long-term forest health.
- Thin intermediate and understory components of stand to enhance growth characteristics and reduce fuel loading.
- Promote natural western larch regeneration in areas where Douglas-fir is becoming dominant component in the stand.

Prescribed Treatment:

- Selective thinning, spacing out healthy trees with good crown and bark characteristics on a variable spacing of 40-45 feet (leaving 20-30 TPA). Favor leaving ponderosa pine and western larch, then Douglas-fir in that order. Remove all merchantable lodgepole and grand fir.
- Reduce 80% canopy cover to 30% canopy cover.
- Create openings of 100' on at least two sides of existing clumps or isolated individual ponderosa pine overstory trees in the areas where Douglas –fir is the predominant overstory species.

- Retain at least two snags per acres >14” DBH and two snag recruits per acre to remain standing if they are not a safety hazard.

Harvest Method:

- Tractor Logging with conventional, mechanical, or cut-to-length operations are applicable to this unit.
- Trees marked to leave.

Hazard Reduction:

- Pile and burn at landings following harvest.
- Slash would be lopped and /or trampled to a depth of 18” or less. In openings where ponderosa pine regeneration is a primary goal, slash would be spot piled and burned.
- Excavator pile and burn all slash in excess of retention requirements of 5 to 10 tons per acre on areas accessible to excavator.

Regeneration/Site Preparation:

- Precommercial thin healthy regeneration to promote future growth and vigor.
- In openings where ponderosa pine regeneration is a primary goal, 30% of ground would be scarified during excavator piling and burned.
- Monitor success of natural regeneration and plant seedlings if necessary.

Anticipated Future Treatments:

- Stand conditions would be monitored for future salvage opportunities related to insect and disease outbreaks, severe weather events, fire or other unanticipated circumstances on a case-by-case basis.
- This stand would be evaluated for regeneration and possible precommercial thinning opportunities as the stand progresses in age.

Attachment 4

Mitigations

Mitigation Measures

Mitigation Measures

Roads: A transportation system minimizing road miles and meeting all BMP's has been designed by DNRC. Roads constructed in association with this project total 6 miles, and would remain in place following the completion of this project. After activities have been completed, the roads would be grass seeded and closed to public use. There would be reconstruction and improvement totaling 2.5 miles, involving road surface drainage and opening roads for safe hauling traffic. There would be approximately 1.5 miles of road that would be permanently closed or reclaimed. Upon completion of roadwork, all haul roads would meet Best Management Practices (BMP's) standards.

Wildlife: The following issues have been identified, with mitigation measures (italicized) incorporated into the proposed project.

Gray Wolf: Suspend operations and temporarily restrict use of roads within a 1-mile radius of any known active wolf den. Suspend operations and consult a DNRC biologist if a suspected rendezvous site is observed within 0.5 miles of any ongoing project activities. Close unnecessary roads and skid trails after the proposed activities to reduce the potential for motor vehicle disturbance. Using a combination of topography, group retention, and roadside vegetation buffers, reduce views into harvest units along open roads. *These items would be specified in the Timber Sale Contract and monitored by the Forest Officer.*

Pileated Woodpecker: Favor western larch and Ponderosa pine in retention and regeneration decisions. *Harvest and stand prescriptions accomplish this. Reduce motorized access to reduce potential loss of existing snags to firewood gathering.* Manage for snags, snag recruits, and coarse woody debris according to ARM 36.11.411, 16.11.413, and 36.11.414, particularly favoring western larch and ponderosa pine. *Contract provisions would be in place to accomplish this*.

Flammulated Owl: Favor ponderosa pine in retention and regeneration decisions. Restrict public access to reduce potential loss to firewood gathering. Manage for large-sized snags and snag recruits according to ARM 36.11.411, particularly favoring ponderosa pine. *Mitigation identical to those above under "Pileated Woodpecker".*

Big Game Winter Range*:* Retain patches of dense vegetation and /or clumps of leave trees in harvest units within winter range when possible to provide thermal cover/snow intercept capacity. *Harvest unit and stand prescriptions will accomplish this*. Close roads and skid trials opened with the proposed activities to reduce the potential for disturbance from unauthorized motor vehicle traffic.

Elk Security: Close roads and skid trails opened with the proposed activities to reduce the potential for disturbance from unauthorized motor vehicle traffic. Reduce views into harvest units by using a combination of topography, group retention, and roadside-vegetation buffers. Retain corridors connecting forested habitats to aide movement.

Soils: Limit equipment operations to periods when soils are relatively dry, (less than 20% soil moisture content), frozen or snow covered to minimize soil compaction and rutting, and maintain drainage features. Check soil moisture conditions prior to equipment start-up. On ground skidding units, the logger and sale administrator would agree to a general skidding plan prior to equipment operations. Skid trail planning would identify which main trails to use, and what additional trails may be needed. Trails that do not comply with BMP's (i.e. draw bottom trails) would not be used and would be closed with additional drainage installed where needed or grass seeded to stabilize the site and control erosion. Tractor skidding would be limited to slopes less than 45%. Short steep slopes above incised draws may require a combination of mitigation measures based on site review, such as adverse skidding to ridge or winch line skidding from more moderate slopes less than 40%.

Slash Disposal: Limit disturbance and scarification to 30-40% of harvest units. No dozer piling on slopes over 35%: no excavator piling on slopes over 40% unless the operation can be completed without excessive erosion. Consider lop and scatter or jackpot burning on steeper slopes. Accept disturbance incurred during skidding operations to provide for a portion of the scarification for regeneration. Retain 10-15 tons/acre large woody debris and a majority of all fine litter feasible following harvest (ARM 36.11.410 and 36.11.414). On commercial thin units where whole tree harvesting is used, implement one of the following mitigations for nutrient cycling; 1) use in-woods processing equipment that leaves slash on site, 2) return skid slash and evenly distribute within the harvest area, or 3) cut off tops from every third bundle of logs so that tops are dispersed as skidding progresses. *These measures would be specified in the timber Sale Contract and would be monitored by the Forest Officer.*

Hydrology: All forestry Best Management Practices (BMP's) would apply to limit the potential for sediment delivery to dry draws and swales. This would further limit the potential for sediment introduction.

Stand growth and Vigor: A concern was brought up regarding the growth and vigor potential of the stands in this project area. Silvicultural prescriptions are designed to maintain and improve stand growth vigor, while maintaining DNRC's commitments to managing for a biologically diverse landscape.

Visual Effects: The selective harvest prescriptions, the use of skyline yarding systems, and the inclusion of a buffer strip along the main roads should minimize the visual impacts.

Weed Management: Roads and skid trail approaches would be seeded and spot treated with chemicals following construction and project completion. Prior to entering site, off-road equipment would be cleaned and inspected through the timber sale contract to avoid seed migration.

Attachment 5

Consultants and References

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References

- Forestry Best Management Practices.

- DNRC, 1996. State Forest Management Plan. Montana DNRC, Forest management Bureau. Missoula, MT.

- Green, P., J. Joy, D. Sirucek, W. Hann, A. Zack, and B. Naumann. 1992. Old-growth forest types of the Northern Region. USDA Forest Service, Northern region. Missoula, Montana.

- Losensky, J. 1997. Historical Vegetation of Montana. Contact #970900. Montana DNRC. Missoula, MT. 109pp.